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JNO. R. DUNLAP. H. C. PEARSON.

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THE EVOLUTION OF THE STRIKE.

ORIGINALLY the idea of strikes involved only a question of the compensation for labor. Ostensibly they are still conducted with the same purpose in view; but the motives have been greatly modified by time, and it is doubtful if the idea of the compensation for labor has inspired more than a small proportion of the strikes which have recently demoralized the industries of the country. The labor organizations have become numerically powerful, and they are used by designing men for promoting plans ulterior to those for which these organizations were formed.

Take the Debs insurrection, nominally a workmen's or laborers' strike, as an illustration. Pullman, suffering as almost every other industrial operator is suffering from the prevailing depression, found that he could not pay the wages that he had been paying without traveling in the direction of bankruptcy, and he informed his workmen of the necessity of reducing their wages or closing his shops. They would not accept the reduction, and so he suspended operations as the only alternative. He could not justly be censured for his action, for it was precisely what the workmen themselves had practically dictated when they refused to accept the best terms that he could offer; and it was all that he could do unless he had the capital and benevolence to run an eleemosynary institution. But, directly, the organization of which Debs seems to be the czar, took up the question, and decreed that the Pullman shops should be kept open at the cost of Pullman, no matter what the event.

Now will any one suppose that the real motive of the Debs insurrection was what it was reported to be? There may be a very low order of intelligence in the train-men's union; but it is not so low that even the most stupid could not see that it was impossible to keep open the Pullman shops after they had ceased to pay running expenses. They were closed by the act of the Pullman workmen themselves, and the proprietor would have been a great simpleton to try to keep them open in the face of their decree. Then we are not at liberty to presume that the Debs insurrection was raised to promote the interests of the Pullman workmen. Something altogether more subtile must have inspired the outbreak.

As a matter of fact, the workmen of the country are falling under the control of the cranks without knowing it themselves. We have a set of ignoramuses, not numerically very strong probably but very active and aggressive, who do not understand the political constitution of the country which they inhabit, and who think that an increase of political powers will furnish a universal panacea for all the ills that afflict humanity. By courtesy, these men are sometimes called Populists and sometimes State Socialists; but there is no use of coining words in their behalf. The good old-fashioned word idiot defines them better than any new invention in philology; and these are the men who are using the uninstructed workmen who make up the great body of the labor organizations for the promotion of their own schemes. They wish the govern-

ment which never created them, and never would have created them in a million years, to come into possession of the railways, the telegraphs, the electric-light and -power plants, the mines, and about everything else that seems to be visibly within reach, and they can see no way of promoting their schemes that promises quite so well as a scheme for making the management of these interests by any other than political agents impracticable.

There can be little question but that many of the strikes of recent years have had their origin, however vaguely defined, in the craze for government ownership of the instruments of production. This means, of course, the abandonment of liberty and the rehabilitation of despotism; but the workmen are not political philosophers, and they have been led on by men who were artful enough to disguise their real purposes from all except those who were esoterically in sympathy with their movement. The tactics of these men is very dangerous, too. We see already in the progress of the Debs insurrection one railway practically in the hands of the government, and can see, also, that it will take a higher regard for the principles of the constitution than we have been in the habit of seeing manifested in recent years, if the step thus forced upon the country does not pave the way for still other steps of a yet more sinister meaning.

The hope of the country is in the lunacy of the conspirators. In former years, when directed by men who were exclusively labor leaders, there was a method in the management of strikes which made it very difficult to compass their defeat. They were never permitted to become top-heavy. They were never allowed to involve so many workmen at the same time that the employed workmen who were concerned with their success could not maintain the strikers in idleness for a time in order to wear out their employers. But when it comes to calling out hundreds of thousands of workmen at the same time, the danger is not nearly so threatening. A few workmen may have put money in the savings-banks where it could be held for just such an emergency; but by far the larger number will have come to the end of their resources in both money and credit within a few days, and then they must either find work, go hungry, or take to the highway. It is impossible to regard all this talk about a general strike as anything more than bluff. There are possibly a million idle men in the United States at this time, and it is inconceivable that a million men until now employed will surrender their places and leave them vacant until they are filled by the unemployed.

THE COSTLINESS OF COWARDICE.

SO far the sales of garden-hose this season have been quite satisfactory to the manufacturer. Ere the season closes the gross amount of sales will be fully as large as they were for last year. The season, however, has not been one that has fully satisfied the retailer, for the reason that he has been in a funk and has not had the courage of his convictions. The general belief among retailers was that they should use the normal amount of hose. Stocks were low, their customers would surely need a certain amount even were the season a wet one, and yet they put off ordering until they were pressed for the goods. Then, instead of giving the usual sized orders, they made them as small as possible. The result was that they ordered very often and paid in extra freight and extra express charges what should have been an addition to their legitimate profits. For this they have no one to blame but themselves, and if the bright salesmen do not use this lesson with telling effect another season it will show a most marvelous lack of enterprise.

MACKINTOSHES SELLING WELL.

THE clothing salesmen are already out for the fall trade, and to the surprise of the pessimists orders are being taken that are most encouraging. One of the largest manufacturers of mackintoshes in New England, speaking of the trip just finished by his manager, said:

"We have already orders in hand for future delivery that will equal last season's business, which with us was large. I confess that I am a bit surprised, for I was prepared to see business move very slowly until the latter part of August. I note one feature that does not please me, however. The call is for cheaper goods. Perhaps that was to be expected, but when my men come in with small orders on the cheaper goods and large ones on the high costs, I feel as if the business were growing more stable. Then, too, we can give a customer so much better satisfaction if we only have a chance to afford good materials and good work."

A canvass of the principal makers of mackintoshes shows a most cheerful feeling,—a feeling that sales only, and good ones at that, can bring forth.

DEATH OF A RUBBER EDITOR.

THE last number of our London contemporary (*The India-Rubber Journal*) contains the following announcement of the loss which it recently sustained:

"It is our painful duty to record the sudden death, on the 15th ultimo [May], of Mr. Thos. Frederick Ball, who has occupied the position of editor of this paper since its start. Although not known to many in the trade, his duties requiring that he should spend his time in studious researches into the varied branches of the rubber trade, he has ever been ready to assist any applicant who wished to learn the history of rubber, or the various applications to which this ubiquitous article has been put; and to put into fitting words the description of the various patents, novelties, factories or persons, connected with a trade not yet one century old. To all who knew him, our late editor was a man who preserved an equal temper even under the most trying circumstances, and was never known to give vent to wrath in spite of numerous small inventors, who, imbued with the idea that their 'progeny' was going to revolutionize the world, persisted in calling or writing that they thought scant justice had been done by the very short notice of it in the paper. Our staff have all the most pleasing recollections of him, and his place among us will be hard to fill. The editorial chair thus left vacant has not at present been filled up, but we hope shortly to make an appointment which will be appreciated by the trade."

GUTTA-PERCHA IN AN OCEAN CABLE.

Factory Methods as Seen by a Newspaper Writer.

THE part which Gutta-percha fills in the manufacture of an Atlantic cable is described in a newspaper article * by Ida M. Tarbell, as the result of a visit to Woolwich, England, where are located the works of the great electrical engineers, Siemens Brothers & Co. The cable described is one which is now being laid across the Atlantic. After describing the construction and the qualities of the copper wire—or, rather, rope—chosen as a conductor, the writer refers at length to the Gutta-percha insulation used.

The Gutta percha used at Woolwich comes direct to the factory from Singapore, and in as virgin a state as Malay and Chinese adulteration ever allow it to depart. It arrives in big lumps, which often have grotesque shapes, rude animals, droll human figures, things "never on land or sea." The chunks are sliced into small pieces, softened by hot water and steam, and torn to pieces in a "devil-ing" machine to get rid of the sago flour, sawdust, clay, and stones put in by enterprising Orientals. When cleansed, it is passed into a series of troughs, where it is steamed, crushed, pummelled, and twisted into a reddish-brown substance of an extraordinary rebellious look, quite capable, one would think, of resisting any amount of electricity. More rolling and beating reduces this mass to a pliable condition, and when it comes from the final rollers it is in sheets of varying thicknesses, soft and supple and adapted to all sorts of uses.

It is the thicker sheets which are used to insulate the copper rope. They are packed around it so firmly and smoothly that not an air bubble can remain between copper and insulator.

When the insulated strand on the core of the cable, as it is henceforth called, passes from this operation, it must go to the testing-room to find if the insulating is really perfect, or if a little electricity still can escape from the copper. It would be useless to make this test in the air, since even without an insulator the current does not pass readily into air. It must be tested under water, in the medium in which it is to lie in the future. Shallow tanks filled with water receive each section, and, after lying twenty-four hours in the water in order to come to the same temperature, the test is applied. If the effect which ought to be produced on his galvanometer, by passing into the core a certain quantity of electricity, does not result, the electrician knows that there is a fault, and that the insulation is imperfect; that is, that the electricity is escaping. And if something is wrong, how find it out?

There is nothing that can be measured with more accuracy than electricity. The laws which govern its flow in a body are perfectly understood. The electrician knows how much he pours in. He can draw it out, measure it, treat it, in short, as if it were in a pipe. A leak in an electric wire is treated, then, in about the same way that a leak in a water-pipe is, and can be located quite as exactly. When once located then it is an easy matter to repair the fault.

Each section of core made is about one nautical mile in length. As the eleventh Atlantic cable is 2201 nautical miles long, we have then 2201 pieces to make. These pieces as fast as they have passed the testing room are stored in tanks under water and brought out next to be jointed.

A joint is one of the most difficult and delicate tasks in cable-making. The twelve copper wires must be perfectly joined, and, more important still, perfectly insulated. The least imperfection at this point may cause a future expense of tens of thousands of dollars, and untold inconvenience to business and loss of credit to a firm. Naturally, the work is attended with the greatest caution. It is carried on in little cabins made especially for the purpose, and the jointers, as the workmen are called, are never allowed to do anything else.

To see a joint made I climbed up into a swallow's nest of a cabin, fastened in some mysterious way to the side of a wall of the "core" tank room. In the center of the little room sat an imposing individual, whose characteristics seemed to be rotundity, profuse sweating, and absolute cleanliness. An assistant shared the narrow space with him; a few simple iron tools and several big gas-jets served as his equipment.

By the time I had succeeded in perching on the edge of this aërial workshop in such a way as not to fall into the gas-jet burning at my elbow, or into the cable tank gaping below, two lithe, shiny black cable cores were passed up to the assistant. With them came a tag giving the number of the joint to be made, for every joint in all this 2000 miles of cable is numbered and recorded, and its history, from the day it was made up here in the jointer's nest until it falls into the sea, can be traced.

The assistant sized the core, cut off a few inches of the ends, pared down the Gutta percha in such a way as to leave two or three inches of copper wire visible, bevelled off the edges of each with a file, laid them together, soldered them and then wrapped them tightly for a distance of a half-inch with fine copper wire. This wire insures a connection even if the two ends should pull apart.

The "imposing individual" had done nothing so far, and it was explained that in fact he was not allowed to touch this kind of work. It would "spoil his hands," and everything in joining the Gutta-percha depends upon the hands. No machine can do the work, so delicate is it.

When the copper joint was done the core was passed over to the real jointer, who fastened the writhing thing solidly, and, having pared down the Gutta-percha until he had perhaps a foot in all to work on, heated the gum on each side with a spirit lamp, and then proceeded with his fingers to work it down evenly until the copper was cov-

ered. The next step was to build up the insulator. One after another strips of Gutta-percha which had been heated at the end were applied, wound around the core, and carefully worked and molded the length of the wound. The danger in this operation is that a bit of dust, an air bubble, a speck of moisture will be left in the insulator. If this happens, it is sure to cause a fault later, hence this heating and kneading and caution against dirt. Experience has shown, too, that no machine will pack the Gutta-percha at this critical point in such a perfect way as the human fingers. They alone can feel when the work is progressing properly and is finished satisfactorily; hence the care to keep them always sensitive, to prevent their becoming callous by rougher work. At the end of a half-hour the "joint" was pronounced done. Had it not been for a slight bulge—the thickness of the copper binding wire—it could never have been discovered.

The joints of each day are tested at night by the electrician, first for their size with a gage and then for the insulation. This latter test is simple and interesting. One end of the length of core is applied to a battery, and the other insulated in the air. The joint is then laid in a dish of water, placed on an insulated table, and a copper wire is run from the water to a galvanometer. The current being turned on, any escape from the joint must pass into the water, be taken up by the copper wire, and marked by the galvanometer needle. If no electricity escapes, or not more than the amount allowed—since no absolute insulation is possible—the joint is marked "passed."

Evidently the core, as it now stands, is very poorly prepared for being dropped to the bottom of the sea. It must be protected from the chafing of sands and rocks, and from the possible wrenches it will have from anchors. Its real protection will be a sheath of steel wires, but these, of course, are unfit to go directly against the soft Gutta-percha. They must be separated from it by a packing. Jute is the substance used for this packing, and it is spun about the core exactly as the copper wires were about the central strand. Over this goes the steel sheathing, which is twisted about the jute-covered core in the same fashion.

As one goes about among the spinning machines he notices that the steel sheathing varies greatly. Here is one of 24 small steel wires; another of but 13, but the wire is so much heavier that the cable resulting is much bulkier than the predecessor; another of 12, but still larger in diameter; and still another where the sheath is no longer made of single wires but of strands of three twisted together. In fact, he sees seven different varieties, the cores of which are the same, and of each he is told, "Yes, that's for the Atlantic cable."

This contradictory-looking information is easily explained. In the middle of the Atlantic the cable is dropped from two to three statute miles. Now, evidently a cable paid out to this depth has a considerable weight of its own length to support, and in every movement it has to overcome the friction of an inclined plane of water two or three miles long. To make its weight as little as is consistent with absolute strength is then important. As in deep sea a cable is far away from all disturbance, it may without risk be made much lighter than in shallow water; so for the deep sea the smallest cable is made.

As the cable draws nearer the shore, where the dangers are greater, heavier and heavier types are adopted until at the end, where there are rocks and currents and men and boats, the huge "shore end," as the largest size is called, is laid.

As all the various varieties of cable come the last time from the spinning machines, they receive three or four coatings of tar. From these tar baths they are run out of this strange weaving room over pulleys into the tank-house, the place where they are stored under water until needed to go to sea.

It is a very fascinating operation, this putting away of the cable, and it may be watched easily from the scaffoldings run around the top of the tanks. The end of the length to be run in is not carried down, but is left out where the electrician can get at it, for even now the ends belong to the testing-room.

As the cable comes over the pulleys into the tank the men at the bottom guide it evenly around and around in great coils from the rim to the cone which fills the center. It is not so simple a matter, and every motion of the curling thing must be watched to keep it from kinking or from overlapping its neighbor. While one cable hand runs around and around, guiding it into place, others at regular intervals hold the coils in position.

As soon as a fair portion of a flake is laid, a curious operation begins—giving the cable its whitewash bath. Big tubs of whitewash are let down, and with a species of mammoth mop the stuff is swashed on. The object is to prevent sticking, the fresh tar of course doing just that if not prevented. As soon as a flake is finished, the cable is run back to the rim in a curve—square turns would be dangerous for the wires—and a new flake is begun. At the end of each day's work the water is turned on, and the cable is left to soak in its element. Indeed, it is never left long enough without water to become dry.

MAKING DEAD MEN BREATHE.

DR. EDWIN DE BAUN, of Passaic, N. J., makes the announcement regarding the time-honored statement that a man has died from lack of breath, that if breath was all he needed he should have lived.

Dr. de Baun decided to try a new experiment. He passed a small rubber tube through the nose of an infant and down into the throat. Closing the mouth, he forced air through the tube from a rubber bag, inflating the lungs, then releasing the pressure from the mouth, and he found, as he expected, that the elasticity of the muscles of the chest caused immediate contraction of the lungs, forming a complete respiration.

This was kept up for 45 minutes, when natural respiration had been restored and a life had been saved. Since then Dr. de Baun has perfected this hastily improved apparatus, and finds that animation may be often restored within 15 minutes.

The apparatus is as simple as it is ingenious. It consists of a long rubber tube, near one end of which is a piece of soft rubber with which to cover the mouth and nose.

At the other end are two rubber bulbs. After the tube has been inserted between the teeth and the mouth and nose covered tightly, the lower bulb is compressed, forcing air into the second bulb, which acts as a reservoir.

This second bulb is much more elastic than the other and maintains a steady pressure of air through the tube. It is covered with loose netting, which acts as a sort of safety-valve against over-pressure. The tube is fitted with a stop-cock that may be used to lend force to the first few respirations.

A few compressions of the lower bulb are sufficient to fill the lungs. Then the pressure on mouth and nose is relaxed, and the lungs are emptied by the natural elasticity of the muscles of the chest. This elasticity remains even after death, and with this instrument it is quite possible to make a dead man breathe regularly as long as the application continues.—*Boston Record.*

THE STUDY OF RUBBER COMPOUNDING.

By Edward F. Bragg.

THE problem of rubber-compounding is the most important and also one of the most difficult which the practical rubber-manufacturer has to solve. The many varieties and qualities of crude rubber and of compounds, and their various combinations into a multitude of different goods, make the problem an ever-changing one and worthy the best efforts of our brightest and most thoroughly equipped men. The physical properties of the different gums and of the various "compounds" we can never change. They are a fixed quantity, to be reckoned on with a fair degree of certainty. But by their combination, varying in kind and proportion and by the variation of their treatment during the different processes of manufacture an endless variety of results can be obtained. Success is gained when a given article is produced at the least cost of raw material or stock. It has been demonstrated again and again that one compound has produced a better quality of goods for a certain specific place than other compounds which cost considerably more per pound. This is a familiar fact to all old rubber-men and demonstrates unquestionably the possibilities of the future.

The essential qualifications necessary for success are a thorough knowledge of all the physical properties of each of the raw materials which enter into rubber compounds, the relative cost of each, and their general effect upon each other when combined. Just as complete a knowledge is necessary of both the essential and the merely desirable qualities of the article to be made. Having these, a keen and acute observation of a series of intelligently-made experiments must lead one nearer and nearer to the desired result. How near he finally arrives depends wholly upon his capacity and his ability to see beneath the surface of each experiment and detect the cause which produced the obvious effect, to increase that cause if the results are desirable ones and to remove it if not.

Many men, when they have reached a point where they can manufacture an article at a profit, stop contented. "It is good enough," they say. This is failure. They fail to grasp the fact that the leaders are continually moving on; that one day the market price of that article will drop and, in spite of their assertions that their competitor cannot get out of it whole, that he is losing money on it; that it is merely "a temporary break in price," and that the man across the street continues to sell it at the new price and not only to his own customers but also to a constantly increasing number of their own. Then they realize the situation, and do, through force of circumstances, for self-preservation, what should have been done long before through business enterprise and energy. A cheaper compound found years before would have meant success, it would have meant a clean profit of the difference in cost of the two compounds, until the inevitable drop arrived and a strong position in which to instantly meet that drop when it finally came. To discover it when forced to do so, although as difficult a task, brings no reward. The reward vanished with the vanishing market price. He has merely, in an awkward, uncomfortable kind of way, left the old ruts unwillingly, and, overcoming his inertia with difficulty, avoided failure at the last call. Success is just as far away as ever. It is across the street with his competitor who has the trade and the profits as well. For it is to be presumed that he finds a profit even at that price, for the price is one of his own making—not of theirs.

A NEW PNEUMATIC TIRE.

A NEW tire patented by Frederick G. Taylor of Providence, R. I., is described as one in which the expansion of the tread part is limited to certain degrees, which has a very simple and effective valve through which air for inflating is forced, and which is peculiarly adapted to be fastened to the wheel-rim. The tire is built of a combination of layers of textile fabric and rubber, and has an inflatable tubular part, from the upper part of which extend longitudinal securing lips and from the lower of tread part similar lips extend. The outer surface of the tube may have strips, the loose edges of which may be cemented to the lips after the elastic part of the tire has been secured to the wheel-rim and tread. The outer parts of the lips may be recessed to receive the wheel-rim and the metallic head-plate, and these may be secured to the elastic part of the tire by rivets or lacings.

The metallic tread is formed of a thin continuous strip of mild steel, the length of which is slightly less than the circumferented length of the elastic part of the tire when expanded; it may be flat or slightly corrugated to insure a better grip on the ground, and if desired an additional

tread of rubber or leather may be fastened to the outer surface of the treadplate.

The improved valve has a tapering elastic stem, the perforation in which extends through the wall of the tubular part of the tire, and in this perforation is secured the upper end of an elastic cord, to the lower end of which is fastened a rubber ball valve. The outer tapering surface of the stem is screw-threaded and a cap is screwed upon it to prevent the escape of air from the tire. When air is forced in the ball is driven downward, stretching the cord and allowing air to enter, but when the air-pump is removed the pressure within the tire forces the air partly into the lower end of the valve stem and effectually closes it.—*The Wheel.*

THE PERFECT BICYCLE-TIRE.

*By Charles E. Duryea.**

"TELEMACHUS" says "the tire inventor who brings out a tire that does not need repairing will reap a fortune," or words to that effect. Now I usually lie awake nights looking for just that sort of a reaping-machine. I would rather reap a fortune than anything I can think of at short notice. I have a number of seductive-looking schemes on hand at all times with which to tempt the winged and wheeled goddess, but a tire that will not need to be repaired is not one of them. "Telemachus" writes a good article on the tire question, but on this point I fear he has written without thinking.

The question is simple and the conclusion sure. A tire that would not need repairing would be one that could not be damaged by use, and a tire that could not be damaged would require such a margin of strength that it could not be sold to those who know what a good tire is. One cannot serve two masters, and the riding public are insisting on light weight, easy riding, and great comfort. To get these, they buy light wheels, although every mechanical engineer knows that the life of a light wheel is much shorter that of a heavier one, and the liability of breakage much greater; they use light tires because they wish the greatest ease and comfort, in the face of the fact that a light tire will puncture easier, burst easier, and wear out sooner in all probability because of its being so near to the danger line. We even see tires that have only a strip of rubber for a thread regardless of the fact that the fabric must be more or less wet all the time, having no shoe to protect it, and so must soon rot out and be worthless. With such a craze as this in front of the inventor, it would be folly for him to add weight that is of value only in the occasional emergency of a puncture, in order to secure a tire that is puncture-proof, self-healing or self-repairing.

Something cannot be had from nothing, and these devices add weight, cost, complication, and destroy to a greater or less extent the active value of the tire. If there is a fortune in any of them it is rather because there are more suckers than wise men and not because they are devices that the wise man desires.

I experimented with the self-repairing idea early in 1891, and dropped it six or eight months before it was shown at the Philadelphia Show, because of several defects that seemed opposed to true progress. I coated the inner tube on the inside with a thick liquid that would not flow through ordinary holes, and if it did exude through a large hole it stiffened on exposure to free air not saturated with its vapor, and so formed a sort of flexible scab that prevented further loss. For all small punctures it was a positive patch and did not leak in passing over pebbles as other methods may do. It would last for a month or two and was easily renewed. But with all this in its favor, it had faults, and one of them seems to me to be fatal to all devices of this kind, viz.: it had a limit to its ability depending conits weight and on the air pressure. A puncture that leaked on the road or when the tire stood in a given position for some time would refuse to show when tested in water and so could not be fixed. Every one knows that it is little trouble to put on a patch after one finds the leak, and that it is the minute leaks, that cannot be heard or seen, that require a tub of water and a close search to find, that are most dreaded, and in the self-fixing tube most of the leaks were of this kind. Therefore, aside from its adding weight, it caused more trouble than it saved and one never knew when his tire was fixed so it could be depended upon till the next puncture.

Likewise with puncture preventers. I have an application in the patent office on a puncture proof band that adds little weight, destroys little life, and is less bulky than any I have seen, but it has faults, and I doubt very much as to whether it will ever see the market or not. Its weight amounts to but little but its destruction of life in the tire is easily measured by the aid of a resiliometer, and the fact that it is a third piece to the tire is a source of destruction to the tire. There should be but one body of fabric in a tire shoe, for it is continually bending, and if there are two one must slide on the other and wear each other out. Riders of the old rag tires know this, and others can see it at once, by bending a couple of cards laid one on top of the other and watch them slide one on the other. I have known shoes damaged from this action in less than a thousand miles.

No, the tire of the future is not one that will not puncture or one that will repair itself, but one that may be repaired most easily and certainly, that will not blow off or pinch the air-tube as do the clinchers often, that has no ugly plugs bulging out at each repaired spot as has the single tube, that is not cemented to the rim, that fits any kind of rim, and that does not depend on the constrictive action to hold it on the rim. This last point is not seen by many. Nothing can do two jobs so effectively as one, and the tire that depends on its fabric to hold it to the rim as well as to hold its air in position, is losing in life, and must necessarily have a greater strength in its fabric than if it was held to the rim in some other manner.

The ideal tire would seem to be an inner tube tire, using a shoe open all along the base and so held that it may be pulled off the rim at any point, and the air-tube exposed without loosening any locks, hooks or other fastenings, yet firm enough on the rim to not come off by itself if deflated suddenly on a hill or like dangerous place. It should fit any style of rim, for one often desires to change. It should be held to the extreme edge of the rim, so as to prevent rolling and yet use a narrow rim. It should not creep.

With such a tire one could make a permanent repair of any size hole if he has a little sheet-rubber and some solution, and make it in as quick time as any repair is possible. One would not have to carry an assorted lot of plugs, nor tools to insert them with, nor string to pull out the tube with. In the absence of patching-rubber and solution, such a tire may be ridden by

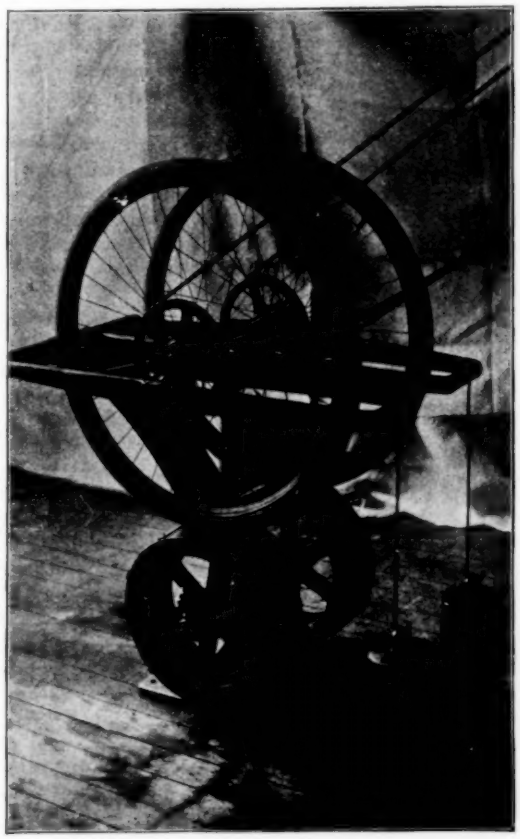
* In the *Bicycling World*, June 8, 1894, in answer to a correspondent using the signature "Telemachus."

sticking on a postage-stamp, a piece of chewing-gum or a bit of tire-tape till one can get better material. Such a tire may have its tube solutioned to the shoe and be patched as a single-tube tire if preferred, with the advantage that in all punctures where the plug method seems faulty, it may be pulled loose from the shoe and patched as an inner tube again. This gets all the good and as little of the bad as possible in both systems. Whether such a tire may be had or not is another question, but to this question I have devoted a good portion of my energy for many months past, and think I am safe in saying that the solution is not far off.

A MACHINE FOR TESTING RUBBER TIRES.

THE American Dunlop Tire Co., instead of waiting for the test of actual use of their bicycles in the service of riders, have decided to have the tests of their tires made before placing them on the market. "We do not want to experiment at the expense of our patrons," the company say; "if experiments are to be made, we have to make them in the regular course of our work." In the long run, this is the safest policy.

The problem was to subject the tires to the conditions approximating as far as possible those of actual service on the roads, and thus determine the requisites of a safe and strong tire. A machine was constructed a few months ago for this purpose by the company, and gradual improvements have been made in it since until now it fully meets the object in view. The cut herewith given shows the machine as it is to-day.



MACHINE FOR TESTING RUBBER TIRES.

It is necessary to have two elements,—pressure and a rough surface; the test of course applying only to the ordinary wear and tear of the tire, and not to unusual and extraordinary accidents. Accordingly, the machine consists of two radial arms or beams carrying bicycle-wheels of the ordinary pattern and shod with the tires which it is desired to test one end of the beam being journaled and the other carrying a weight of about 50 pounds. The bicycle-wheels being fastened to the middle of the beams, the tires are therefore subjected to a pressure of about 100 pounds. The wheels rest on small wooden pulleys across whose surface are fastened, at short intervals, cleats of wood, to represent the rough surface of the road. The wheels are driven as in a bicycle by use of belts which take the place of the usual sprocket chain. They are driven at a speed of from 28 to 30 miles an hour. It will thus be seen that all the ordinary conditions of actual use are obtained in this machine, except the varying conditions of road surfaces and weather. As it is used principally, however, for testing the fabric from which the tire is made, these conditions are not absolutely necessary. Each bicycle-wheel carries a cyclometer which accurately measures the distance run.

All kinds of tires have been subjected to this test, and it is found that the tire which will, in actual use, run from twelve to eighteen months on the road, can be broken up on this machine in from 2 to 3 weeks.

The Sea Island cotton fabric used by the company named has stood a test of this machine of 18,000 miles which, in the hands of the average rider, would represent several years of use. Even at the end of this remarkable test, the fabric showed but very slight signs of chafing, and is still undergoing a further test. Other fabrics which have been tested have run from two hours to one week before giving out.

The English branch of the Dunlop Tire Co. is also using this machine. It has not been patented, the company using it merely to test its own tires, and not caring whether other tire manufacturers use similar machines or not.

Mr. Kirk Brown, in speaking of the advantages to the company resulting from this test (the advantages to the buyers of tires are obvious), said: "Suppose we sell a tire to a bicycle-man, and he meets with no accident for two months. We go on in the meantime making tires of the same fabric and quality thinking everything is all right. Then we find out that the tire has given out after only two or three months' use. All the other tires are liable to give out in the same way, and the company's reputation might be injured. With our testing machine we run no such risk. When we discover a fault in a tire we remedy it at once, and don't go on making other tires having the same latent defects."

The tendency in the rubber trade, as elsewhere, has been of late in the direction of guaranteeing to patrons a certain length of service. It is this doubtless which prompts the introduction of tests, which make it possible and safe to offer such guarantees.

RECENT contracts of the Berlin Iron Bridge Co. (East Berlin, Conn.) embrace the iron roof and traveling crane for the new power-station of the Metropolitan Electric Co., at Reading, Pa.; the new boiler-house for the Coe Brass Manufacturing Co., at Torrington, Conn.; the roof of the new electric-light station of the Flatbush (N. Y.) Gas Co.; the bridges for the new terminal facilities for the New York, New Haven, and Hartford railroad, at Providence, R. I.; the gas-house extension for the Brookline Gas Co., at Allston, Mass.; and a new transfer station for the Washington and Georgetown railroad, at Washington, D. C. The Batopilas Mining Co., of Chihuahua, Mexico, have placed an order for four iron buildings and four bridges with The Berlin Iron Bridge Co. These buildings are to be shipped by steamer to Galveston, Texas, and thence by rail to the interior of Mexico, where they must be carted a distance of 100 miles on mules up into the mountains.

GUTTA-PERCHA AND RUBBER IN GOLF.

GOLF is slowly but surely making headway in America. Golf clubs are being organized everywhere, and the woman's columns of the Sunday newspapers are discussing the feminine costumes appropriate to the game. Golf is played over an extensive stretch of ground in which holes about four inches in diameter are placed at distances of from 100 to 500 yards apart. The game originated in Scotland, and it is said that there are special reasons for the exceptional popularity of golf in the land of grass-covered sandy downs. But it is now extensively played in England and the British colonies, and it will doubtless become popular in America.

India-rubber and Gutta-percha men are interested in golf on account of the use of these materials in the implements of the game. The game requires balls, clubs of various kinds for driving the balls, "tees" used for elevating the ball for drive from the "tee" or starting-point, gloves, and any number of sundries. Golf-balls are made of the purest and finest Gutta-percha, and the best quality sell at $5 per dozen. "Spalding's clan ball" will float, and is therefore the only ball that can be used with safety near water. The compound used and the method of constructing the ball are a trade secret. Besides the clan ball there are two other kinds,—Spalding's club ball, also made of choice Gutta-percha, and Spalding's practice ball, made of less pure Gutta-percha and intended for practice games. The price of the club ball is $4 per dozen, and that of the practice ball $3 per dozen. The spread of the game will involve no inconsiderable demand for Gutta-percha.

WRIGHT & DITSON'S GOLF-BALL.

India-rubber enters into a few of the other implements. In the golfing gloves the left hand is rubbered, the object being to allow a good grip, which only India-rubber makes possible. The gloves are made of dogskin and buckskin, with open backs and short fingers. In some of the clubs, the head is shod with rubber instead of brass, which is more generally used. Golf tees are made entirely of rubber. The price of the regulation style is 25 cents each.


GOLFING GLOVE.

When not in use during winter, it is best to keep the balls in a moderately warm room. Frost causes them to crack or split.

Golf has the advantage over some other games that both very young and old can play it and that it does not call for violent exercises followed by inactivity. A golf course should not be less than three miles in extent, and it is desirable that the link (the open down or heath) should be near the seaside, an undulating and irregular character of the surface being essential to a first-rate golf course. This fact also explains the necessity of having balls that will float in water.

GOLF TEE.

The implements described and shown in the cuts are manufactured and sold by A. G. Spalding & Brother, Nos. 126–130 Nassau street, New York.

THIS WOULD BE CHEAP RUBBER INDEED.

TO THE EDITOR OF THE INDIA RUBBER WORLD: I am interested in a discovery by which vulcanized rubber can be manufactured with the use of only 1/32 of pure rubber, and other ingredients costing not more than $1 per ton. I would like to have your opinion as to whether rubber vulcanized can be made at any such figures nowadays. I would like to know the ingredients and preparation of same entering into the manufacture of vulcanized rubber, and the probable cost per pound for raw material only. HUNTER M'DONALD.

Nashville, Tenn., May 16, 1894.

[THE prices for rubber compounds vary from 10 cents to $1 or more per pound. It is probable that our correspondent has taken an interest in what is known as a rubber substitute, and like most men who are not familiar with the rubber business, values it more highly than it is worth. As a matter of fact, of all the substitutes that have ever been shown in the American markets, none have shown a value of more than 15 cents per pound. Further than this, it is only in certain lines of goods that substitutes can be used. Of course there is the possibility that this gentleman has secured what many inventors have long striven for—a compound that really equals rubber, and can be produced at a low cost. Unless, however, we could see samples of the product, and further than that could see it in use, and still further could be assured that it had been tested for years, our opinion, or indeed that of any rubber man, could not be especially valuable or final. If our correspondent will send us samples, we will very gladly classify his discovery as nearly as may be.—THE EDITOR.]

BLUE LEAD IN RUBBER-MANUFACTURE.

TO THE EDITOR OF THE INDIA RUBBER WORLD: Can you tell me where I can purchase blue lead in powder form and can you inform me how it should be used and what its effect is? J. C. C.

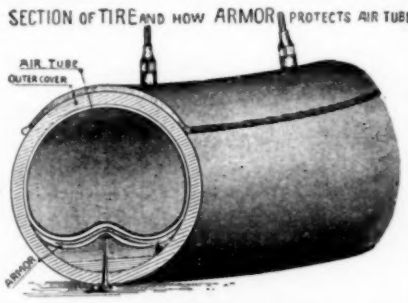
New York, April 25, 1894.

[FOR some months past there has been considerable interest in the blue lead question. We have interviewed perhaps a half-dozen manufacturers of lead products who have more or less supplied the rubber trade with litharge and white lead, and with one exception none of them know what blue lead was. The suggestion of the majority was that it must be pig-lead reduced to powder. Our informant, however, states that it is lead fumes and that numbers of mechanical goods companies have bought it in the past, but exactly for what purpose it was used, he was unable to say. Experiments are now being made with the ingredient and if our correspondent will keep his eye on THE INDIA RUBBER WORLD he will get further information in a later issue.—THE EDITOR.]

THE latest return of the India-Rubber, Gutta-Percha, and Telegraph Works Co., Limited, filed on May 8th, shows that, out of a nominal capital of £812,000 in £10 shares, 50,000 shares have been taken up, and that the full amount has been called and duly paid on each. The total received is therefore £500,000. The Argentine postmaster-general has applied to his government for funds to pay this company for 30,000 insulators, bought at the rate of 90 cents each.

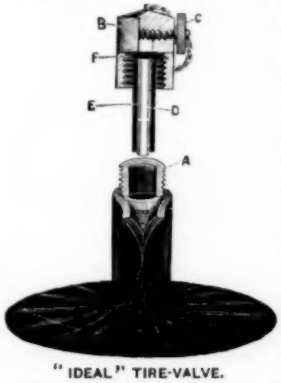
NEW GOODS AND SPECIALTIES.

ANOTHER plan for resisting puncture in pneumatic tires comes from Maryland. Of it the inventor says: "Here is a device through which no man can puncture his air-tube in legitimately riding roads or streets, even if he cuts the outer casing into a sieve; one that does not affect the resilience and adds but a few more ounces to the weight of the wheel. It can be applied in a few minutes to any form of pneumatic tire that has an air tube, rendering it practically as safe as a solid or cushion tire. The armor is made in lengths to fit 26, 28 and 30 inch wheels, and 2, 1 3-4 and 1 5-8 inch tires. It is also made of varying thicknesses for touring, road or track work. It is very easily applied, the directions, for a tire that is cemented to the rim, being to take out the air tube, put a little soapstone powder in the outer casing, then fasten end of air tube and armor together with a strong cord and pull them both back into the outer casing putting the armor between the air tube and the ground surface of the outer casing. With a little care the armor will pull in perfectly straight and smooth. When the tire is back on the wheel inflate to compress and set the armor in its place. For detachable tires one set may be removed and the armor inserted with the fingers. The weight is only about four ounces. This armor is the invention of S. Milford Shindel. The goods are manufactured by the Puncture-less Tire Armor Co., Hagerstown, Md.



"IDEAL" TIRE-VALVE.

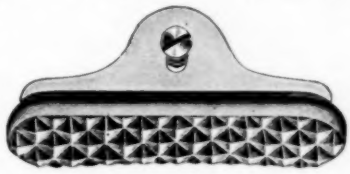
THERE have been hosts of valves for pneumatic tires and some of them have been most excellent. The Ideal claims to be one of the best of these and bases its claims upon the following facts,—that it never leaks, that it can be affixed to any pneumatic tire, it inflates easily and deflates rapidly, it closes automatically to prevent the escape of air and has no spring and no plunger. It is very simple in construction in its vital parts and has but one washer, and that one is not subject to the slightest abrasion. The method of affixing the tire is as simple as patching a puncture and takes no more time. In other words, it is simply to cut off the old valve stem and cement the Ideal valve in its place. In the cut of valve shown in the accompanying illustration, *A* is the valve case around which is vulcanized a rubber stem with flanged base, *B* the deflating cap, *C* the dust stopper, *D* a perforated tube, *E* the contractile sleeve fitting closely the exterior of perforated tube *D*, *F* the washer to make an air tight joint when the cap *B* is screwed down home upon case *A*. Manufactured by William K. Genet, No. 15 West Ninety-ninth street, New York.



"IDEAL" TIRE-VALVE.

A NEW PEDAL RUBBER.

EVERY wheelman is more or less interested in pedals. Some of them like the rubber pedal best, others are in favor of the rat-trap. Others stilll would like a pedal that could be used interchangeably, and it is just to this constituency that a new invention known as the Adjustable Pedal Rubber will appeal. The illustration shows exactly what it is and how it is attached. It will be seen that a single small bolt holds the rubber in place, and with a very little filing any make of rat-trap pedal can be easily changed into a combination pedal. Perhaps to understand this thoroughly one should see the catalogue issued by the manufacturers of this pedal, and read over the very simple instructions that they give and examine the illustrations with which the catalogue is adorned. Manufactured by Reed & Curtis Machine Screw Co., Worcester, Mass.


A NEW PEDAL RUBBER.

PITTSBURGH TIRE-PROTECTOR.

IT is always a provoking and sometimes a very serious thing when a pneumatic tire becomes punctured; indeed a vast amount of inventive ability and energy has been spent in inventing tires that can ride safely over tacks, barbed wire, and broken glass, and still remain inflated. What is known as the Pittsburgh tire-protector is an invention designed absolutely to protect the inner tube. They are made to fit the interior portion representing the thread, of any tire containing an air tube. They consist of specially fine-woven metallic cloth, the threads being made by a secret composition of brass, bronze, copper, and antimony. This cloth is so flexible that it can be used as a belt making 300 revolutions per minute, without crystallizing or cracking. Further than this the cloth is surrounded by a fabric woven expressly for the purpose, which is cemented to it giving it great strength, and while it preserves its extreme flexibility makes it as strong to resist puncture as steel. The protector is 3-32 inch thick and after a very slight use is nearly as pliable as silk. It is said to be indestructible and one pair will last a life time. During the season of 1893 these protectors were tested over the roughest roads of western Pennsylvania and according to the manufacturers there was not a single instance of a wheel containing them having received a puncture. Further than this it is claimed that the resilient qualities are not lowered at all by the introduction of this protector and that the weight is only increased from 10 to 12 ounces. It is said also that in riding the wheel glides over the obstruction with greater ease and comfort to the rider than where the protector is absent. Manufactured by the Pittsburgh (Pa.) Tire Protector Co.

THE CLIP BRAKE.

RIDERS of almost any style of wheel to-day are apt to strip the wheel,—that is to remove every part that is not absolutely necessary, as each ounce of weight means extra work. The old-fashioned brake is one of the first things to go. At the same time many riders want to be in a position to stop the wheel quickly in case of emergency. The Clip brake herewith shown has proved itself one of the most powerful in existence, and yet is so light that it adds practically little weight to the machine. It weighs but 5½ ounces and has a solid spring, so that there is no rattling, and is readily detachable. The clamps and blades have lateral slots for side adjustment, and it can be fitted to any width of fork. The dip or angle of the blade is regulated by wedges thin on one side and thick on the other, and the whole affair can be adjusted to a nicety. The brake is heavily nickeled and fitted with rubber discs to prevent the feet from slipping. With the feet on the coasters and heels on the brake the wheel is under perfect control when coasting. Manufactured by the Clip Co., Warwick, N. Y.

THE CLIP BRAKE.

SINGLE-BREASTED BOX COAT.

THE accompanying cuts show the latest fashion for the autumn in the line of men's waterproof garments. Two views are presented,—front and back. The new garment is called the single-breasted box coat. It is without a seam in the back, and is very ample, thus allowing men to walk in it comfortably and even use it for driving. It is made of different styles of cloths,—blacks, blues, tans, and fancy tweeds. The sleeves are of satin. Altogether it is one of the neatest garments put on the market. Both material and workmanship are of the highest quality, manufactured by the Birnbaum Rubber Company, No. 47 East Twelfth street, New York. Mr. Hanseli, the manager of the company, is bringing out elegant styles in ladies' waterproof garments this fall, cuts of which will be shown later. Mr. Hanseli has been for ten years the manager of the company's branch in Paris, and has a host of friends there in the trade. This enables him to obtain the newest and latest fashions in ladies' garments.

FRONT VIEW. BACK VIEW.

THE COLUMBIAN LADIES' MACKINTOSH.

THIS is a sleeveless garment with full 28-inch military cape and 9-inch gored collar, the cape being adjustable. It takes the name "Columbian" from the fact that the collarette with which it is fitted is so called throughout the cloak trade. The cape is furnished with a very handsome lining, which makes it a beautiful riding cape, or it may be worn as an exceedingly handsome cloak. A further advantage of the military cape is that it easily goes over the large sleeves that are now in vogue. In this garment as in others manufactured by the same house, special attention is paid to style and fit. Manufactured by the Clifton Rubber Manufacturing Co., Boston.

COLUMBIAN LADIES' MACKINTOSH.

FIREMEN'S LIFE-SAVING RUBBER JACKET.

EVER since the great leather-district fire in Boston there has been more or less agitation regarding life-saving apparatus for firemen. It will be remembered that at that time numbers of firemen perished because their retreat was cut off by the flames. In order to provide a convenient and practical life-saving apparatus for firemen, Mr. L. E. Pease has invented a life-saving jacket. This jacket enables the fireman to carry 100 feet of rope without in any way encumbering himself or hindering his usefulness. The rope to be thoroughly out of the way is run back and forth up the back of the coat and tacked just enough to hold it in place. In case the fireman is obliged to resort to it as a means of escape he can easily pull it out and use it very quickly. A piece of rubber tubing is put over the rope to be used as a grip. Mr. Charles T. Wood of the Stoughton Rubber Co. (Boston), is one of the interested parties and will give further information regarding it.

LIFE IN THE BRAZILIAN RUBBER COUNTRY.

By M. F. Sesselberg.

I.—RUBBER IN THE STATE OF MATTO GROSSO.

THE discovery of India-rubber forests in the state of Matto Grosso is of recent date, and the rubber-extracting industry is in its infancy, but it promises to become important, the number of trees is so great. Notwithstanding the difficulties that arise from want of laborers and means of transport, the industry is rapidly developing and is expected in a short time to supplant the rival interests of gathering *herva-matte* (Paraguayan tea), and poaia meadow-grass hay. It is estimated that of the present crop the municipality of Diamantina, in Matto Grosso, will export 10,000 arrobas* of this valuable product.

The municipality of Diamantina, like nearly all the other municipalities of this state, is very extensive, containing an area of nearly 12,000 square kilometers, traversed by splendid water-courses which nourish in one part the head-waters of the Tapajós and Xingu, branches of the Amazon; and in another those of the Paraguay, a branch of the great Parana. The village of Diamantina (which takes its name from *diamante*, the Portuguese for diamond) is situated about 108 miles from the capital. Falling once into decay, after diamond-hunting was abandoned, it is now rapidly reviving through the discovery of much rubber found in its vicinity. The rubber-sap can be gathered only from April to September, as the trees grow in damp, marshy places near the water-courses, which are uninhabitable during the remainder of the year. The process of rubber-gathering has thus been described in a report made to the governor of Matto Grosso:

"From April to May the rubber-gatherers commence to arrive and enter the woods—now no longer over-flooded—and their first work consists in looking after old trees, *i. e.*, trimming them. Then they open new paths, each individual taking a certain number of trees for his own account. These clumps of trees are not always near together; it sometimes happens that they are sparsely scattered through the forest. This requires the 'paths' to be placed at a great distance apart, especially in the *vertentes* (declivities), far away from the more voluminous water-courses, where the rubber-trees are more compact. After the paths are opened and cleared, the material with which to *abrochar* (close in) the trees is prepared. Small sticks of the 'bority' (*palmeira elegante*) are driven into the ground at a convenient distance from the lower path of the rubber-tree and a sort of rough, circular fence is made. This fence is fastened together, not only with wooden pegs but with a sort of natural clay (*tabatinga*) which becomes of a stone-like hardness. Then the *canecos* (tin cups) are fastened to the tree,—one or more according to the number of incisions made. When these preparations are finished,—they generally occupy forty days,—the rubber gatherer, at least once a day, visits all his trees, giving them little gashes, cut with his hatchet, from which drops the clear, white sap, about the consistency of cream, into the *canecos*. When these are filled they are emptied into buckets, passing through a *cocho* of small dimensions, where the sap receives a very little alum (previously dissolved in hot water) to coagulate it. The form is generally that of the vessel,—a rectangular parallelepipedon.

"After the *bolacha*, as these gatherers term 'borracha' (rubber), has the desired consistency, it is put into a sort of press between two boards, on which are placed heavy tree-trunks. This labor occupies the *seringueiros* until September, when they begin to leave for their homes. These men are furnished periodically by the *dono* (patron) with necessary provisions, consisting of *xarque* (dried beef), beans, rice, farinha, pork, and salt; also with tobacco and with ammunition for hunting the game so abundant in these forests.

"When the rubber crop is finished the patron gets together his utensils, with the rubber produced and previously weighed, which is taken on animals (mules, horses, and oxen) to the markets of São Luiz and Cuyaba, in which ports it is embarked for foreign exportation, being definitely despatched at Curumba. Land freights are 4 to 5 reis per arroba, and river freights at 1 reis more or less from these points to Curumba."

The utensils to which this letter refers consist of two zinc buckets, little hatchets, with 200 *canecos*, and anything else furnished by the proprietor of the rubber-paths.

II.—THE ISLAND OF MARAJO.

THIS too-little known island is situated south of the equator, at a distance of about twenty miles from the district of Pará, from which it notably differs in climate, fauna, and flora. It is bounded on the north by the Amazon river (in which are two large islands, Caviana and Mexiana, cut by the line of the equator), on the south by the Pará river, on the east by the Pará river and bay of Marajó, and on the west by the Amazon river and a network of channels. This island has an area of nearly 42,000 square kilometers, measuring 96 miles north and south, and 127 east and west. In this area are situated the towns of Soure, Breves, and Chaves; the villages of Muana, Curralinho, São Sebastian-da-Boa-Vista, Monsaras, Cachoeira, Ponta de Pedras, Anajas, and Afflua, and the settlements of Salvaterra, Monfort, Condeixa, and Trovão. The island is naturally divided into two distinct sections,—one being the campus or meadow-ground, in the north and east, and the other the forests to the west and south. The first is devoted to cattle-raising, and the other to the India-rubber industry.

The principal lake of Marajó is the Arary, eighteen kilometers long and four wide, with a flat island called Mae Joaquina in its northern point. The rivers which follow the eastern and western sides of the island are of

* 1 arroba=25 pounds.

great importance, one crossing the part of the island devoted chiefly to agriculture and the others the part in which the rubber industry is most developed, and where is found a numerous population engaged in this industry. The larger of these is the Igarape-Grande, on whose banks is situated the pretty town of Soure, of which brief mention should be made. Referring to my note-books of 1890, when I was last there, I find this memorandum: "Soure, a pretty, compact, little village, picturesquely situated on the Paracanary or Igarape-Grande. Yesterday I had a long, delightful canoe row on this river, and had my first glimpse of the Amazonian fish *bôto*, of legendary fame. Navigation, by the way, seems to be carried on here in two ways, by canoe and on ox-back. (The poor, patient oxen look queerly enough when saddled.) In winter, I hear, as about a third of the island of Marajó is covered with water, canoes are tied to ox- or cow-tails, and so drawn about. A few of the houses here are quite comfortable, though most have hard mud floors, but to have a garden is nearly impossible, on account of the leaf-devouring ant *sauba*. All plants have to be placed in large, perforated clay vases, which are put into deep clay plates somewhat larger than the pots of clay vases themselves, and which are kept filled with water. The church and prison are in the same building, which strikes one as an oddity. The fish-drying industry is the principal one of the place."

From a note-book of 1888 I find the following as to Breves, the second town of Marajó: "This town is situated on the southwest corner of Marajó, standing at a few feet above the river. It is reached by a flight of rickety, wooden steps, several of which are missing, and seems to have three streets, all nearly overgrown with weeds and grass. It is the stopping-place for steamers on the Amazon for fuel, which is supplied in the shape of sticks, three feet long by four inches square, costing about a dollar per thousand. The population is composed of Portuguese, half-breeds, and negroes, with a few Indians. Rubber-collecting, getting out timber for fuel, and the manufacture of roughly-painted calabashes, for drinking-vessels and for holding farinha, etc., are the industries of the place."

A very strange natural phenomenon in Marajó, which until now has been little studied, and which prejudices greatly the campos of cattle-raising in the south of the island, are the *atterroadas* or low knolls or mounds, formed, it is supposed, by *minhocas* (worms). Of these *atterroadas*, the eminent Dr. Vincente Chermont de Miranda, says, in his recent pamphlet on "Marajó—Studies on its Soil, its Animals and its Plants": "The pasture grounds of Marajó covered with these low knolls are of inferior quality, not only on account of the general scarcity of their vegetation, but in the difficulty they give in taking care of cattle. Some estate-holders have large areas of their lands completely wasted, with no hope of seeing them bettered. Those who have tried to remedy this evil have found their labor lost. A few years ago a large estate-holder sent abroad for compress rollers with which he hoped to level these mounds, but the result was *nil* and the roller lies forgotten in the middle of his fields. These famous *atterroadas* are in many places, to make them more noticeable, painted in bright colors by the *fazendeiros* or estate-owners, for should a man's horse (were he galloping on horseback) run against them, the rider might receive a very serious fall. Many persons in Marajó have attributed this strange configuration of land to the footprints of cattle, constantly passing in the rainy season over the soft earth, but by those experienced this has been refuted. In some places these *atterroadas* reach 30 to 35 centimeters in height and diameter, and cover miles upon miles of land. It should be noted that sandy lands are exempt from them, also high lands, whose declivity facilitates the rapid flowing away of water, and low lands submerged in the rainy season by more than 35 centimeters of water. . . . Now these worms (*minhoca*), which without doubt do really form these mounds, cannot live in water a long time. Neither can they exist in a dry soil. To thrive they must have a constantly damp soil. In the summer or dry season they always enter the earth at a lower and lower layer, where exists still some dampness. There is in the Amazonian region the great *minhoca*, supposed to be the *Anteus gigas*, which in summer, instead of procuring far below the surface the necessary humidity, go by millions to the marshy grounds left by the descent of lowering lakes, in search of the welcome *ujuco* (a sort of mud). The only rational method of destroying these *atteroadas* would seem to be, in either drawing or submerging them, when, the cause having ceased, the effect ceases."

Many years ago the island of Marajó was fairly overrun with wild horses. They became a perfect nuisance, so that the cattle did not thrive. A certain sum was offered by government per head, and they were slaughtered by hundreds. Then a plague, as if it were a sort of Nemesis, broke out among the survivors, and not one single horse in Marajó was left to tell the direful tale. Afterwards and for a long time the cattle industry did thrive, but of late years it has been in a wretched state. Last year a law was passed in the Pará state congress with the aim of favoring the pastoral industry on the island. It offered more protection to the estate-holders and aid in their imports of the best races of cattle and sheep. Several measures against cattle-stealing were to be instituted, in part by sending thither a rural police, and a movement for the obstruction of rivers and the canalization of the island was adopted. So it is to be fervently hoped, if not in the near future, at some time approaching the millennium, that the Pará market will be supplied with a greater quantity of meat, better meat, and at a reasonable price.

It should be mentioned that sheep here are of no earthly use except for their meat, for when acclimated many years they lose their wool and become covered, like the goat, with hair, a fact which may interest those interested in climatic effects.

In this article I do not enter into the subject of the rubber-extracting industry of Marajó, a process similar to that which I have lately described for the whole state of Pará. The rubber-forests of the island are generally in such low grounds that the dwellings of the rubber-gatherers are constructed upon strong poles, several feet from the ground.

CONTRIBUTIONS TO THE CHEMISTRY OF INDIA-RUBBER.

By P. Carter Bell, F. I. C., F. C. S.

V.—THE ACTION OF THE SULPHIDES OF THE HEAVY METALS UPON CAOUTCHOUC—CONTINUED.

IN drawing the reader's attention to the importance of understanding the behavior of the sulphides of the heavy metals it is important that he should thoroughly understand the action of sulphur alone on rubber. In a former paper it was shown that, during the process of vulcanization, sulphuretted hydrogen was always produced, and the production of this chemical substance is always proportionate to the amount of sulphur, and to the time that it is exposed to the action of heat. If, in the rubber composition, a certain percentage of a heavy metal is incorporated, most of the sulphuretted hydrogen is taken up, thus producing the sulphide of the same metal. The vulcanization of rubber and its composition can be obtained by means of combined sulphur instead of free sulphur; for instance, a mixture of antimonic sulphide and rubber will produce an elastic compound of superior quality to a composition obtained by sulphur alone, a brilliant red rubber being the result which will not effloresce by age. Several experiments on this subject have been made by the writer to arrive at the necessary quantity of antimonic sulphide to produce the finest quality of rubber possessing the highest elastic properties, and from the results obtained it was found that the following composition possesses these merits.

	Percentage.
Pure Pará gum	75
Antimonic sulphide, c. p.	25
Total	100

This composition became fully vulcanized after being heated for three hours at 310° F., and not the slightest effloresence was detected after being exposed to the atmosphere for several weeks.

What reaction has taken place? It seems that the caoutchouc in the rubber composition has the power of extracting sufficient sulphur from the antimonic sulphide to change its molecular construction and at the same time reducing an equivalent number of molecules of antimonic sulphide to antimonious sulphide. The color of the mixture is always darker after vulcanization, proving somewhat that the black antimonious sulphide is produced. There is always slight evolution of sulphuretted hydrogen when these vulcanized compounds are made.

When antimonic sulphide, in connection with rubber under certain conditions, is used with rubber compositions, it is quite unnecessary to add sulphur or its compounds to procure vulcanization, for excess of sulphur will reduce the antimonic sulphide when in contact with rubber, as the following experiments will show. This important matter came under the writer's notice some years ago while connected with an English firm. At that time great trouble was experienced with a certain grade of rubber used in the manufacture of surgical tubes. The rubber composition contained the following ingredients:

	Percentage.
Pará gum	20
Madagascar gum	20
Black substitute	20
Whiting	20
Red oxide	10
Antimonic sulphide	10
Total	100

When these goods were vulcanized in the ordinary way they became spotted on the surface and quite black in the interior. Now, the problem was as, this composition contained no free sulphur, what caused the discoloration?

Hundreds of yards of this tubing had been produced with the same rubber composition for months previously with no ill effect, but suddenly without warning each batch became defective, and it was not until the writer had made the following experiments that the solution of the difficulty was manifest.

EXPERIMENT NO. 1—SULPHUR.

	Percentage.
Pará gum	30
Sulphur	10
Antimonic sulphide	30
White substitute	30
Total	100

This composition was vulcanized in one hour at 280° F. The result of this experiment was, that the surface of the rubber was quite red, but on cutting into the inner side it was perfectly black and no trace of the red color was seen.

EXPERIMENT NO. 2—VENETIAN RED.

	Percentage.
Pará gum	30
Sulphur	10
Venetian red	30
White substitute	30
Total	100

This composition was vulcanized one hour at 280° F., and the result was such that the rubber was not in the least defective and the color was perfectly homogeneous throughout.

EXPERIMENT NO. 3—WHITING.

	Percentage.
Pará gum	30
Sulphur	10
Whiting	30
White substitute	30
Total	100

This composition was vulcanized one hour at 280° F., and the result showed no change in the rubber.

EXPERIMENT NO. 4—WHITE SUBSTITUTE.

	Percentage.
Pará gum	30
White substitute	30
Antimonic sulphide	40
Total	100

This composition was vulcanized for three hours at 300° F., with the result that there was no change in the brilliancy of the color.

EXPERIMENT NO. 5.

Pará gum	30

Black substitute	30
Antimonic sulphide	40
Total	100

The vulcanization in this instance was three hours at 280° F., with the result that the surface of the rubber presented an extremely dirty reddish color, while the interior of the sample was quite black.

From the foregoing experiments the action of each of the ingredients of the compositions on the antimonic sulphide is now practically explained. The experiments No. 2 and No. 3 prove conclusively that whiting and Venetian red are not changed in the slightest degree when in contact with sulphur and rubber compounds; therefore these bodies may be taken as being perfectly inactive. The discoloration of the tube compositions could not have been produced by the latter chemical substances. The reason of experiment No. 1 was due to the supposition that the reaction which had taken place in the tube composition was due to free sulphur; therefore the free sulphur must be hidden in one of the ingredients.

From experiment No. 1 it will be seen that free sulphur has a decided effect upon antimonic sulphide, and if it had not been for the presence of the same the reduction of the antimonic sulphide would not have taken place, as is shown by experiment No. 4.

The deduction which can be gathered from the preceding experiments is that the whole cause of the entire decomposition of the antimonic sulphide is due to the black substitute contained in the tube composition. The question therefore resolves itself into an examination of the black substitute for free sulphur. The analysis of the black substitute was made as follows:

A certain quantity of the substance was cut up into fine pieces and placed in a Soxlet's extracting apparatus, and the whole was exhausted with carbon bisulphide. The carbon bisulphide solution was then carefully evaporated in a weighed conical flask, and the residue determined in the usual way. The residue was composed of paraffine wax, sulphur, and a black greasy substance which proved on examination to be a partially sulphurized oil having a totally different chemical composition from the insoluble portion.

The residue obtained from the carbon-bisulphide solution was treated repeatedly with ether, all the fatty substances in this way being removed, leaving behind an ethereal residue composed solely of sulphur, this was determined and the percentage of soluble matter was obtained by difference.

ANALYSIS OF THE BLACK SUBSTITUTE USED IN THE TUBE COMPOSITION.

	Percentage.
Soluble Matter in CS_2 contained—	
Paraffine wax, Fatty substance, Sulphur, etc.	39.70
Insoluble Matter	60.30

RESIDUE FROM CARBON BISULPHIDE.

Soluble in Ether contained—	
Paraffine wax. Fatty substance.	27.45
Insoluble Matter in Ether was—	
Sulphur	12.25

The black substitute which was used in all the tube compositions was obtained from a French house, and by its use many unforeseen difficulties arose in other goods. Until an examination of the substitute was made the cause of these disastrous effects could not be determined, as the rubber firm had such implicit faith in all the chemical substances obtained from that house.

Too much stress cannot be made upon the importance of manufacturers having skilled and unbiased advice upon the suitability of the various chemical substances used in the trade, as an indiscriminate use of these bodies would inevitably produce results which would be far from satisfactory, as the above instance shows.

EXPERT TESTIMONY IN THE ACID PATENT SUITS.

PROFESSOR CHARLES F. CHANDLER, chemist, of New York, testified in the infringement suit of the Chemical Rubber Co. *vs.* Goodyear's Metallic Rubber Shoe Co. and Emmett A. Saunders* that he began the study of chemistry in 1852; continued it at Harvard University and later at the Gottingen and Berlin Universities, and received his degree in 1856. He was an instructor in Union College (Schenectady, N. Y.) for eight years, and for the last twenty-seven years in New York city, where he taught in the School of Mines and the School of Arts, Columbia College, and in the College of Pharmacy. His attention was first drawn to the chemistry of India-rubber in 1865, when he was then called as an expert in patent litigation, making experiments in the factory of Poppenheusen at College Point, L. I. Since that time he had been called on several occasions as an expert in rubber suits: notably the Carbolic India-rubber hose case, the Newbrough dental vulcanite case, Austin G. Day's hard-rubber case, and the Kerite case of Austin G. Day. He had spent considerable time in rubber-factories, and much more in laboratory experiments upon rubber and rubber compounds. He had studied the action of acids and other chemical reagents, on vegetable and animal fibers, by themselves and in connection with India-rubber. He was the author of the article in Johnson's Cyclopedia on India-rubber.

He testified that the effects of acids, such as sulphuric and hydrochloric, on rubber and rubber compounds under varying strength and temperature was known prior to 1878; also that their effect on cotton and woolen fibers was well known prior to that date. These acids have the same effect on such fibers, whether combined with India-rubber or not. Only the strongest acids affect rubber. Any one with the knowledge aforesaid would naturally use sulphuric or hydrochloric acid in destroying fiber in

* In THE INDIA RUBBER WORLD of October 15, 1893, will be found the particulars of the points at issue in this suit. Portions of the testimony taken have appeared in the issues of January 15, February 15, March 15, April 15, May 15, and June 15. —THE EDITOR.

rubber compounds. If rubber waste was in mass they would also naturally reduce it by cutting or breaking, and would be likely to use corrugated rolls run at unequal speeds, such rolls being in common use in rubber factories. Further than this, they would naturally wash the acid-treated product to remove the acid and waste. He well knew prior to 1878 that the stronger the acid the briefer time it took to affect the solution of fibers. It was also a matter of general knowledge that an increase of temperature favored solution; a hot solution being always more active and effective than a cold. He was familiar with the processes as described by Saunders and Hall. He described and explained at length Charles Goodyear's English patent of 1853, and Hiram L. Hall's United States patent of 1858. He testified that the defendant's process was substantially the same as Hall's. Following this, Professor Chandler spoke of six other patents that have already been recorded in these articles, and explained them in detail.

He testified that no invention was required in selecting the strength of acid. Only the common sense of the manufacturer, aided by his skill and experience, was necessary to bring about the proper results. Sulphuric and hydrochloric acid have substantially the same effect on textile fabrics, and are in general considered as chemical equivalents of each other. When questioned about the use of live steam in the place of closed coils, he said that he should not consider that an invention. It was possible to use coils, steam or hot-water jackets, or open fire. They had been in use for such purposes for years, and would naturally be employed. Further than this, it would be natural to use a wooden tank lined with lead, and an open pipe for conducting steam, because it would help in agitating the mass that was being treated. He referred to the Murphy process, and said that it was practically the same as that of the defendant, as was also the process employed by N. Hayward & Co. at Stoneham in every essential particular. This process he reviewed and described at length. He said also that the defendant's process was practically identical with that used by the Boston Belting Co.

In reviewing the Bourne claims, he said three sets of processes were mentioned in the Bourne specification; one where a weak solution of acid was used which rotted the fiber; where a stronger solution liquified the fiber, and a still stronger solution carbonized it. Bourne, he said, disclaimed the first and last, and claimed the liquefaction process. An examination of the Bourne process and that of the defendant showed that the defendant used much stronger acid than that called for by Bourne. In criticism of the Bourne process he testified that a 3-per-cent. or 4-per-cent. solution of acid would not liquefy the fiber, but would simply rot it a trifle more effectively than the acid used in the Hayward process. Bourne's statement that 3 per cent. or 4 per cent. of acid would convert fiber into grape sugar was not true. The Bourne patent calls for a boiling solution, whereas the defendant does not boil his solution. It was his opinion that boiling meant boiling and not heating.

Speaking of Mitchell's patent No. 300,720, the witness said that also called for boiling, and, criticising this patent he said: "The means that Mitchell describes for applying heat to the acid are not adequate to raise the acid which he employs to a boiling temperature, or to enable it to boil." He claimed also that the defendant did not use the strength of acid as called for in Mitchell's patent. He cited letters from Mitchell's attorneys claiming that only pure acids with no water were called for under the claims of his patent. Further than this Mitchell used strong acid to "remove" fiber, and also zinc and whiting. The defendant did nothing of the kind. Defendant did not remove fiber, nor did he attempt to remove zinc and whiting. It was his opinion that if, as Mitchell claimed the Bourne patent was different from the Mitchell patent, then the defendant's process must be different.

Speaking of patent No. 249,970 granted to Mitchell, he took the same exceptions, except with regard to steam. By experiment he had proved that the recovered rubber made by the defendant still contained the whiting, nor does the defendant use live steam, neither does he boil the solution, the temperature being raised to about only 200 degrees Fahrenheit. If, as Mitchell claims, the defendant's process infringed Mitchell's patents, then Mitchell's claims are anticipated by the Goodyear patent of 1853, Hall of 1858, Dodge of 1851, Hayward of 1863, Faure of 1871, Heinzerling and Liepmann of 1875, Burghardt of 1878, Burghardt, Rowley & Salamanson of 1878. Also by the process of the Gutta Percha and Rubber Manufacturing Co., of N. Hayward & Co., and of the Boston Belting Co. He testified that Mitchell in these patents claims that strong commercial sulphuric acid or muriatic acid heated, was used without destroying or injury to rubber. Strong sulphuric acid, when heated, chars and destroys India-rubber. If that process was practised the rubber would be completely destroyed. He had tried the experiment and ruined the rubber. McDermott's patent, No. 262,079, calls for salts of chromium, which the defendant does not use, nor does he inject live steam. In McDermott's patent, No. 311,135, where acid is used alone, it calls for oil of vitriol, which is concentrated sulphuric acid, whereas the defendants use dilute sulphuric acid. Elsewhere the patent calls for other chemicals which the defendants did not use at all. In case their claims could be considered broad enough to cover the defendant's process, the same interference with prior patents and processes would be in force as were mentioned in the case of Mitchell's patents, and in addition would interfere with the processes in the factory of N. C. Mitchell & Co.

Professor Chandler cited twenty-three printed articles on the subject of the action of acids on fibers and on India-rubber. He also placed with the court exhibits of nine experiments showing the effects of acids on cotton and woolen fiber, and seventeen exhibits of experiments showing the effect of acids on India-rubber waste.

The cross-examination of Professor Chandler, which was very lengthy and exhausting, was devoted chiefly to the questions relating to the experiments above referred to.

BRIEF ABSTRACTS OF RECENT RUBBER PATENTS.

AMONG recent patents issued by the United States Patent Office, embodying applications of India-rubber or Gutta-percha to a greater or less extent, have been the following. It is not practicable here to do more than to note the use of rubber in each case, with sufficient detail to enable those who are interested to decide whether or not to look into any particular patent more fully:

TIRES.

No. 519,695.—Device for Attaching Pneumatic Tires to Wheel-rims. Leonhardt H. Brunemeyer, Aurora, Ill.

In combination with a pneumatic tire, a longitudinal plate placed between the inner and outer rubber tubes, having rows of pins fitting in corresponding holes on each side of a slit in the outer tube, and having openings to receive locking studs,—and the flanged studs, each having at one side of the flange a projection adapted to be locked to such plate and at the other side of the flange a projection adapted to enter a hole in the rim of the vehicle.

No. 519,748.—Tire for Wheels or Vehicles. George S. Webb, Aurora, Ill.

In a wheel, the combination with the rim and tire, of a band engaging the tire, mechanism for connecting the ends of the band and drawing and holding it taut, this mechanism including a rack and pinion, a longitudinally perforated shaft to which the pinion is secured, a detent for preventing retrograde movement of the rack, a stem for lifting the detent occupying the perforation of the shaft, and a cap screwed onto the projecting end of the stem and serving as a lock for preventing the accidental inthrust of the stem, and serving also to facilitate its inthrust when the detent is to be raised.

No. 519,976.—Bicycle-Tire. Carlton J. Spofford, Dolgeville, N. Y

In a bicycle tire of the character described, in combination with a hollow flexible tube, of a series of spiral springs arranged in a continuous series, each spring being in contact with or in close proximity to the next adjacent spring in the series, straps connecting the springs at their upper and lower ends and adapted to be drawn within the hollow tube.

No. 520,504.—Pneumatic-Tired Wheel. Walter Turner, London, England.

In a pneumatic tired wheel, the combination of a grooved rim having a flat bottom deeper at one side than at the other, of a cover or jacket the one edge of which is of a larger circumference than the other and has a pocket formed in it in which is located an endless fixing band or wire and the other edge of which has a bead or enlargement with which an expansible and contractable fixing band or wire engages, and of an air tube adapted to inflate the tire.

No. 520,536.—Pneumatic Tire. Joseph H. Pierce and Amos J. Dickson, Glenwood Springs, Col.

In a pneumatic tire the combination with an external tube, a series of internal expanding tubes, a less number than the whole of which is capable of being expanded to fill the external tube, and a rim, of a plug let into the rim and having an outer threaded end, an annular channel, a concentric cavity, and a series of perforations in the channel, tubes leading from the perforations to the expanding tubes, a ball, loosely mounted in the channel, a cylindrical member threaded on the plug and having a valved bore leading to the channel and at its outer end adapted to engage with the pump, and a cap arranged removably on the threaded end.

No. 520,643.—Pneumatic Tire. Robert Hoffman, Pittsburgh, Pa.

As a new article of manufacture a protecting strip adapted to be interposed between the inner and outer tubes of a pneumatic tire with its ends overlapping, the strip consisting of woven wire fabric and a covering of canvas, the canvas on opposite sides of the strip being united together and to the wire fabric by cement, the cement filling the interstices of the wire fabric whereby is formed a solid compound strip.

No. 521,605.—Shield for Pneumatic Tires. Samuel M. Schindel, Hagerstown, Md.

The combination with an pneumatic tire of a protective cushion or shield, consisting of one or more layers of textile fabric alternating with one or more layers of such fibrous material as raw cotton, the textile fabric being treated with tar and powdered resin and the whole united under heat and pressure, the shield so formed being attached to the lateral portions of the tire and detached from the bearing face, or portion.

No. 521,606.—Shield for Pneumatic Tires. Samuel M. Scrindel, Hagerstown, Md.

The combination with an pneumatic tire of a protective cushion, or shield, consisting of one or more layers of textile fabric alternating with one or more layers of such fibrous material as raw cotton, with an interposed layer of wire netting, the textile fabric and wire netting being treated with tar and powdered resin and the whole united under heat and pressure, the shield so formed being attached to the lateral portions of the tire and detached from the bearing face or portion.

No. 521,273.—Bicycle-Tire. Robert P. Scott, Cadiz, Ohio.

The combination of a flanged wheel rim having a cut away portion, a filling piece therefor having an aperture, a pin passing through the aperture for securing the same to the rim and a pneumatic tire having an endless non-extensible selvage lying over the pin and holding it in place.

No. 521,330.—Pneumatic Tire. Albert J. Burns, Fairport, N. Y.

The combination, with the tire and its three supplementary inflatable tubes of a reservoir attached to the rim of the wheel but located apart therefrom, the nozzles screwed through the reservoir, forming valve seats inside the same, the set of independent valves attached to screw stems also located inside the reservoir, and the set of flexible pipes connected with the nozzles and extending to the inflatable tubes.

BOOTS AND SHOES.

No. 520,585.—Overshoe-Retainer. Frank T. Guiher, Waynesburg, Pa.

In combination with an overshoe, a spring retainer secured thereto having an arched portion with an eye or loop at its center of a wire removably secured in the eye of the arched portion with its free end having a right angled extension.

MECHANICAL GOODS.

No. 521,246.—Hollow Rubber Article. Edward L. Perry, Paterson, N. J.

An oil-can or other hollow rubber article having a soft rubber bottom and a lining therefor constructed of spring sheet metal having a concavo-convex central portion and a double flanged rim.

MISCELLANEOUS.

No. 520,241.—Fountain Brush. Henry Ott, Ottawa, Kas.

A fountain brush, consisting of a stem or channel-piece, a hollow and compressible bulb, communicating with one end of the stem, and an ink-receiving and brush-carrying chamber communicating with the opposite end of the stem or channel-piece, and provided with ink passages leading from the interior of the chamber to the brush, and a wire distributor of U-shape, having its bent or bridge-portion depending into the body of the brush, and having its legs passing up through the bottom of and into the ink-receiving chamber.

No. 520,600.—Acid-Proof Composition. John A. Just, Syracuse, N. Y.

An acid proof composition composed of linseed oil, Gutta-percha, sulphur, rosin, shellac, and asphaltum or pitch in the proportions specified.

TRADE-MARKS.

No. 24,703.—Seamless Stockinet Dress-Shields. I. B. Kleinert Rubber Co., New York city.

Essential feature, the word "Invincible." Used since January, 1894.

No. 24,766.—Pneumatic Wheel-Tires. Francis L. Cook, Springfield, Mass.

Essential feature, the representation of an eel the skin of which is partly separated from the body thereof. Used since April 16, 1894.

No. 24,777.—Waterproofed Cloths and Garments Made Thereof. H. Shorey & Co., Montreal, Canada.

Essential feature, the word "Rigby." Used since December, 1891.

No 24,842.—Repellents or Waterproof Cloth. Dexter Woolen Mills, Boston, Mass.

Essential feature, a rectangular space inclosed by the representation of scroll work with the words "Gold Medal," two medallions, one in part overlapping the other, and the words "Paris 1855. London 1862," between the words and the medallions. Used since January, 1892.

PATENTS EXPIRED.

No. 190,728.—Straps or Devices for Securing Hose to Couplings. S. Adlam, Jr., Boston, Mass., assignor to J. A. Caldwell, same place. (Filed April 19, 1877.)

The device for securing hose to couplings, consisting of the metallic looped strap provided with a cross-bar, whereby one end may be passed through and bent over the other end.

No. 190,889.—Chain-Pump Buckets. E. Miller, Macon City, Mo. (Filed April 17, 1877.)

When it is desired to expand the rubber disk, the groove receives the bulk of the rubber as it expands from the center, thus causing the periphery of the disk to expand without getting hard.

No. 190,953.—Paint Compositions. C. Brown, Meadville, Pa. (Filed October 2, 1876.)

A water-proof paint consisting of pine pitch, pine tar, iron ore, and Gutta-percha.

No. 191,083.—Syringe-Cases. B. F. Sutton, Brooklyn, N. Y. (Filed April 2, 1877.)

A syringe-case having the sliding cover moving in grooves within the box, and, when closed, holding the tubes in place.

No. 191,459.—Carriage Thills and Poles. A. Moffit, Washington, D. C., assignor to himself and C. H. Watson, same place. (Filed May 15, 1877.)

A thill or pole provided at its forward end with an elastic cushion, covering the end of the thill or pole.

No. 191,879.—India-Rubber Surgical Tubes. Edward Pfarre, Brooklyn, N. Y. (Filed April 7, 1877.)

A NOVEL RUBBER SUIT.

THE National India Rubber Co., says a New England exchange, has just completed a rubber combination suit for a southern man which will be of interest to sportsmen. The suit consists of light boots and pants, which terminate at the waist in a sort of float shaped something like a horse collar, with the pointed ends at front and rear, and which can be inflated and deflated at the will of the wearer.

It is designed especially for persons hunting in southern swamps and bayous, but can be used as a perfect safety float in any waters. The inventor, Colonel Lemon, of Hot Springs, Ark., recently tested the invention in the Kickemuit reservoir at Warren, Mass., where he floated about as easily as a duck in the deep water. Skillfully devised tin paddles were attached to his feet, which enabled him to move about at will with good speed. A gun can be handled with perfect freedom, and as the float can be inflated at will, the wearer becomes amphibious, which is a most useful feature in hunting in southern waters. A hundred more of the suits have been ordered from the Bristol company by the inventor.

AN INTERESTING STORY ABOUT RUBBER.

A NEWSPAPER letter from Manáos, Brazil, by Fanny B. Ward, giving her experience in the "heart of the greatest rubber-producing country in the world," has been handsomely reprinted by the New Jersey Car Spring and Rubber Co., in a pamphlet entitled "A Strange Harvesting." It is embellished with illustrations of rubber-gathering methods and of the utensils used. The utensils shown, by the way, are now in the possession of the company. The publication could scarcely have been made a handsomer one, and is certain to be read with interest by all who see it. Incidentally, it will prove an excellent medium for drawing attention to the lines of goods manufactured by the New Jersey company.

ANOTHER INDIA-RUBBER CABLE.

THE Hooper's Telegraph and India-Rubber Works, Limited, will lay about 170 knots of cable for the Cuba Submarine Telegraph Co., Limited, between Cienfuegos and Batabano. It is interesting to record that this cable is to take the place of a Gutta-percha one, which, owing to its exhibiting further indications of depreciation, has now been abandoned entirely. Mr. John P. Hooper, in 1891, made and laid a cable similar to the new one, the manufacture and laying being completed without a hitch.—*Electrical Engineer* (*New York*).

HARD-RUBBER CEMENT.

IN answer to a correspondent the *American Druggist* (New York) says: Vulcanite and hard rubber articles of a similar composition are cemented best by applying a hot melted mixture of Gutta-percha and genuine asphaltum. When applied hot to the joint and the latter closed immediately with pressure this mixture is said to form a good union. A solution of shellac in ammonia water is also said to be of value. The shellac is dissolved in ten times its weight of water of ammonia, and the transparent mass thus obtained (which becomes liquid after the lapse of a few weeks) is applied without additional preparation. When applied it will be found to soften the rubber, but when the ammonia is evaporated it forms a kind of hard coat, and causes it to become impervious to gases as well as liquids.

SINCE the last issue of THE INDIA RUBBER WORLD, the annual meeting of the American Rubber Co. has occurred, resulting in the choice of directors as follows: Robert D. Evans, Joseph Banigan, George A. Lewis, Samuel P. Colt, and William H. Hill, the latter being a member of the banking firm of Richardson, Hill & Co., Boston.

INDIA-RUBBER SCRAP.

THE June number of the *New England Magazine* (Boston) has an exceedingly interesting article by Mr. John C. Wyman on "Rhode Island at the World's Fair," accompanied by eleven excellently-executed illustrations, one of which contains two views of the exhibit of the Woonsocket Rubber Co. Respecting this exhibit the writer says: "The Woonsocket Rubber Co.'s exhibit was the most important and most attractive rubber display in the Leather building. It occupied a large pavilion, in which a variety of tropical plants were placed, one of them a rubber-tree nearly ten feet high. Native weapons and house ornaments from the Pará district of northern Brazil were hung about the walls and columns of the pavilion. Implements used by the rubber-sap-gatherer were shown, and the processes by which the sap is converted into the perfect shoe were so fully illustrated that the whole exhibit constituted a series of object-lessons in the rubber-manufacture."

* * *

CONGRESSMAN CHARLES G. CONN, of Indiana, having added the Washington (D. C.) *Times* to the considerable number of newspapers already owned by him, the New York *Sun* gives an interesting sketch of this gentleman, whose occupation is that of manufacturer. "A few years ago," says the *Sun* writer, "he had a bench in the corner of a jewelry store in Elkhart (Ind.), where he mended watches, clocks, and musical instruments. One day, while repairing a tuba, an idea occurred to him that was worth several million dollars, and resulted in the invention of a rubber mouthpiece for musical wind instruments, which was patented and immediately adopted all over the world. This lucky little hit made Mr. Conn's fortune. At Elkhart he established one of the largest factories in the world for the manufacture of brass and silver musical instruments, which is run on the coöperative plan, and the profits are divided between himself and his employés. He has been mayor of the town several times, and can come to Congress from that district as long as he likes."

AN INKY RACER.
—*Life.*

* * *

"PA, why are those waterproof soles called 'gutta-percha'?" "Because they enable you to perch in the gutter without getting wet."—*Fairplay* (*London*).

* * *

MR. W. R. BRIXEY, in a letter to the New York *Tribune*, states that in no case, to his knowledge, is a manufacturer of rubber-insulated wire using cheap rubbers from the east coast of Mexico or Nicaragua, as claimed by a previous writer quoted in the *Tribune*. The rubbers employed in compounds of high grade insulated wires, Mr. Brixey states, are invariably rubbers purchased on the Amazon,—either Madeira or fine Pará,—costing at present market rates from 65 to 73 cents per pound, according to age, though for mechanical purposes there are undoubtedly cheaper grades of rubber consumed.

THE RUBBER SITUATION IN PARA.

[*From May 17 to June 1.*]

TO THE EDITOR OF THE INDIA RUBBER WORLD: Although the market has manifested all the characteristics for an important business, the transactions were retrenched by the smallness of supplies both from the surrounding districts and from Up-river.

The demand for Island rubber continues to be general and quite in excess of the production, which is curtailed by the rains and the swampy and flooded condition of the forests in consequence of the severeness and prolongation of the rainy season. In the absence of entries sufficient to satisfy the requirements of shippers, Upriver kinds have equally participated in the demand, which has absorbed all arrivals, leaving our market bare of all available stocks.

The principal business was done on the basis of 5/450 for fine Island with lately 50 reis more and 5/800 for fine Upriver, with the established difference of 2/250 and 1/750 for coarse on the two kinds respectively.

Receipts this crop, dating from July 1 to May 31, amount to 19,065 tons as against 18,220 tons for the same period last year. The excess which at the end of January stood at 1625 tons has gradually shrunk to 845 tons, and will show at the end of this month on the termination of the crop an increase on the whole of last year's production of about 4¼ per cent., a moderate figure considering the ever-increasing consumption of this article. The closing quotations are:

Pará fine	2/5 3/8	Sterling per pound English f. o. b., not including shrinkage, freight and insurance.
Pará coarse	1/5 7/8	
Upriver fine	2/6 3/4	
Upriver coarse	1/9 1/4	

The financial condition of the country, together with the scarcity of bills from the approaching termination of most crops and the diplomatic difficulties which have arisen between the governments of the republic and Portugal, have probably been the causes of checking the advance of the sterling exchange, which, after frequent slight fluctuations, now closes firm at the rate of 9 3/8 for 90 days on London.

R. F. SEARS & CO.

Pará, Brazil, June 1, 1894.

HIS FACE WAS HIS FORTUNE.

As he hears the low growls of the brute behind him, his whole life seems to pass before his eyes, and—

He suddenly remembers that, years ago, he was the India-rubber man in a side-show.

—*Texas Siftings Library.*

IMPROVED HEATING AND VENTILATION METHODS FOR RUBBER-WORKS.

By Walter B. Snow.

VENTILATION for the factory as well as the school-house and the public hall is receiving more careful consideration to day than ever before. Laws looking to an improvement in methods and results are being enacted in many states, while their enforcement is being placed in the hands of competent boards of health, of inspectors or of state police. The general principles which control in this matter apply as well to the rubber mill as to any other type of manufactory or to the public building.

This comprehension of the conditions under which a ventilating system must operate led some of the earlier engineers to provide only the exact amount of air required to supply the oxygen for the direct purpose of respiration. That is, this supply was sufficient, provided the vitiated air expelled from the lungs was taken directly away from the person and not allowed to contaminate the surrounding atmosphere. Such a condition, however, was impossible and consequently air was found to be necessary in such quantity as to dilute the contaminated atmosphere to the proper degree. Good ventilation as now understood can be secured only by the provision of from 30 to 50 cubic feet of fresh air per minute to each and every person within the apartment being ventilated.

Upon such a basis, an ordinary school-room accommodating 50 pupils would require from 1500 to 2500 cubic of air per minute, a volume equivalent to an entire change of the air in the school-room once in every 8 to 4.8 minutes. The same thing holds in the factory, only to a lesser degree. Here under ordinary conditions the equivalent of a change once in every fifteen to twenty minutes is sufficient to meet the requirement of thirty cubic feet per occupant, for here they are not as closely seated or located as in the school room. It is evident that such large volumes of air can only be provided with difficulty and uncertainty by any so-called natural methods.

Every evidence points toward the necessity of positive mechanical means to furnish at all times and under all climatic conditions the amount of air required for satisfactory ventilation.

The most economical mechanical device for the movement of air is the fan blower in its various forms. Its combination with a steam-pipe heater has formed in a simple manner both a heating and a ventilating apparatus capable of forcing from a central point large volumes of fresh warmed air to distant apartments and applicable in all classes of buildings. The fan, constructed of steel parts, stiffly braced, is arranged to be driven by a vertical engine directly connected to the fan shaft. The fan wheel is of the ordinary paddle-wheel type, that is, with numerous radial floats or blades and a central inlet opening concentric with the fan shaft. The air passing in at this inlet is centrifugally forced to the outer circumference of the wheel where it escapes into the enclosing case and is forced from the outlet into any desired system of distributing ducts.

The heaters in use with such types of fan are usually constructed upon a series of cast-iron bases so designed that they may be easily bolted together in the requisite numbers to provide the necessary heating surface. Into each of these braces is screwed a series of vertical steam-pipes (usually one inch in diameter) joined in pairs by horizontal connecting pipes above. The interior of each section being divided midway of its length by a diaphragm, the entering steam is compelled to pass up one series of pipes over and down the corresponding series connecting with the other and independent end of the section. The removal of the water of condensation takes place through the bottom at one end of the section.

This form of heater is adaptable at will for the use of either live or exhaust steam, the only change necessary being in the size of the steam supply and drip pipes. When the fan is driven by its own engine, either belted or direct connected (as is desirable to render the apparatus independent of other sources of power), the exhaust therefrom is utilized in a special section of the heater, the expense of operation being thereby reduced to a minimum.

One of the most important features of heating by the blower system, as this is called, lies in the greatly reduced amount of heating surface required to accomplish given results. It must be evident that the large volume of air passing through the heater (usually at a velocity of 1500 to 2000 feet per minute) will produce extremely rapid condensation of steam within the pipes. In fact this condensation is so much greater than that in ordinary direct steam heating coils that the same results in the way of heating may be secured in the case of the steam hot blast apparatus, with only about one-third the amount of heating surface.

Naturally the method of hot-air distribution adopted must be influenced largely by the character and construction of a building, whether of one or more stories, of wood, brick, or stone, or whether new or old as the arrangement of the system depends more upon the construction than the uses of the building, it will be evident that descriptions relative to other types of manufactories will hold equally well in the case of rubber-works housed in buildings of the same design. In the ordinary wooden structures the heated air must almost of necessity be conveyed through metal,—tin or galvanized iron—pipes. When the building is of one story the best results will be secured by carrying the hot-air piping system from the fan entirely around the building close to the outer walls, and well up to the ceiling whence the air may be discharged downward to the floor through drop pipes at intervals of twenty to fifty feet. A simpler but less efficient and certain arrangement in a fairly narrow one story structure consists in merely running a hot air pipe down the center of the building throughout its length and near the ceiling, the air being discharged from numerous side

outlets pointing at an angle downward and outward toward the walls. The principal difficulty with this arrangement lies in the tendency of the air to rise before reaching the floor and to overheat the roof space and monitors top if such exists.

In the case of flat roofs, and particularly in buildings of more than one story, this arrangement is at once simple and efficient. The natural course of the air is then along the ceiling to the outer wall where, becoming slightly cooled, it sinks to the floor and is distributed about the room, of course eventually escaping through cracks, crevices, and porous walls, unless special arrangements are provided for its return to the fan. With such a system the apparatus is usually placed in the basement, the mains on the various floors being supplied by a single riser at some convenient point. Sometimes a series of these risers is introduced, each provided on the different floors with outlets near the ceiling and the horizontal system of mains omitted.

The greatest convenience and economy in the introduction of this system can only be secured, however, in the case of a newly constructed brick building where previous consideration has been given to the necessary arrangements. It is of interest to note that what was doubtless the first adaptation in this country of this system of heating and ventilation to a factory was that in one of the old buildings of the Boston Rubber Shoe Co., at Malden, Mass. In 1873 Mr. Converse, having become interested in some experiments made by B. F. Sturtevant with this type of apparatus and being acquainted with the arrangement installed by Walworth & Nason in the Massachusetts General Hospital applied a large wheel (some 8 feet in diameter) and a heater, so that heated air might be carried in a wooden box along the first story ceiling of one of his mills, air being discharged from its sides into the first floor and through connecting openings in the top into the second floor. A subsequent arrangement in another mill (about 50 feet wide, 240 feet long and four stories high), consisted in conveying the air to the boxes of numerous wall flues whence it was discharged to the various floors.

Although numerous modifications have been introduced, yet this general scheme of arrangement stands to-day as the best and most generally adopted in buildings of this character. The apparatus—fan, engine, and heater—is located in the basement, where it discharges the air into a horizontal brick duct, at regular intervals. For various structures varying from 40 to 60 feet—external pilaster flues—are carried up between the windows. With the base of each of these the horizontal duct connects, and from openings in each story, some 8 to 10 feet above the floor level, the air is discharged across the mill. While desirable that these flues should be located upon the least and discharge toward the most exposed side of the building, yet such an arrangement does not seem to be absolutely necessary, and certain it is that plants are operating successfully under either condition. It has been conclusively shown, however, that even in buildings running up to 100 feet in width and over, satisfactory circulation of the warm air is secured by placing the flues upon one side of the building only. A properly constructed damper should be placed at each of the open ings in order to control the air supply.

While in the public building low velocities of air currents and numerous admission openings are necessary to secure the proper distribution of air without objectionable draught; in the factory, on the other hand, high velocities are required to compel the air movement to points distant from the discharge opening, and the moving belts and machinery serve to aid greatly in its thorough distribution. As a rule the occupants themselves are in motion and their constant change of position is such as to make any possible draughts less noticeable. Of course it is evident that by such a reduction in the number of inlets and by the decrease in flue sizes due to high velocities, the cost of installation in the case of a factory is much reduced from that in a building of the class first considered. This reduction being in addition to that naturally resulting from the introduction of less expensive fittings, operating devices and the like.

The centralization of the entire heating surface within a single heater case must tend largely toward the simplification of the system and its operation. Instead of numerous steam and drip valves in distant parts of the building, a single valve at the heater controls the amount of heat furnished as indicated by the temperature of the air delivered by the fan to the building. Still more important is the fact that all opportunity for disastrous leakage or freezing is avoided. Where the flues are constructed in the walls of the building, there is absolutely nothing to encroach upon the floor space so valuable in many manufactories.

As a further result of combining the entire heating and ventilating plant in a single local apparatus, most perfect control may be had over the quality of the air supplied. This indeed is one of the most important features of the "plenum" system—where air is forced into rather than withdrawn from the building as with the "exhaust" system. Under the former, the air, being forced in, there is maintained within the building a constant, although but slight pressure, causing all leakage to be retarded and preventing the drawing of polluted air from adjacent rooms. This excess of pressure also makes it possible to do away with vent flues, the air supplied finding a comparatively easy escape through cracks, crevices and porous walls and thereby securing its most excellent distribution.

As the true province of all methods of ventilation is to so dilute the impurities in the atmosphere within the given apartment, as to render the same harmless, it must be evident that the blower system is of marked benefit where objectionable odors are generated in the process of manufacture. Thus, for instance, in match factories fitted with the blower system, the supply is so adjusted as to change the air once in about twenty minutes in the ordinary rooms and as often as once in 5 minutes in the rooms where the dipping and preparation of the tips is carried on.

Of course all such arrangements require a direct and continuous supply of air from out of doors through the medium of the fan. But in many manufactories where no objectionable processes are carried on and where the

room space per occupant is large, perfectly satisfactory ventilation can be secured by drawing the air back from the building to the apparatus, reheating it, and again forcing it into the building. Theoretically, the air would soon become too seriously vitiated to permit of a further continuance of this method, but practically, it will be found that no building is even approximately air tight and that in consequence there will be at certain points considerable outward leakage, while at others, usually near the fan the tendency is toward inward leakage to maintain the equilibrium and the constant volume of air within the building, as a consequence enough fresh air enters to keep that within the building well purified. As the air returned from the building has only to be heated from 65° or 70° up to the requisite temperature, while when taken entirely from out of doors it must be heated in coldest weather from about zero up to about the same temperature as in the former case. Returning the air under these conditions will result in from 25 to 50 per cent. saving in fuel, but, of course, should not be undertaken without a clear understanding of its effect upon the ventilation.

It is usually a difficult matter to impartially compare the costs of heating various buildings with different heating systems. The amount of air supplied for purposes of ventilation affects the expense greatly as does the relative sizes and arrangement of buildings and apparatus, certainly if the blower system, supplying a sufficient volume of fresh air for ventilation can be operated at less expense than a system of direct steam heating making no pretense at ventilation whatever, the credit must be greatly to the former. A single case will illustrate. Two mills of nearly equal size, manufacturing the same class of goods were located side by side. One was heated by direct steam the other was both heated and ventilated by the blower system. In the former the average temperature for six winter months was 70°, in the latter 73°, but the consumption of fuel was in the proportion of 100 in the first to only 64 in the mill heated by the blower system. Of course, this cannot be taken as indicating the exact relative operating expense of the two systems under all conditions but it must be evident that the blower system has at least a reasonable margin of economy in its favor.

Although this same type of hot blast apparatus was early applied for drying lumber, wool, cotton and the like, no extensive application has been made for the purposes of drying rubber. The subject has recently been receiving much more attention and a number of drying plants have been installed and are operating with success. Although the main apparatus for heating the mill may also serve to supply the drying rooms, it is usually best to provide a separate apparatus for this purpose. It may then be operated at any time, particularly in summer, when it would be too expensive to run the main apparatus for this purpose alone.

When applied for rubber drying it is customary to deliver the air horizontally near the floor from a series of openings along one side of the room. It thence passes in a mass across the room, coming into intimate contact with the hanging sheets and escapes through openings provided at floor level at the other end or side of the room. It is customary to so arrange these escape outlets that the discharged air may be returned to the apparatus and reheated if desired—this arrangement being of particular utility during the later stages of the drying when the escaping air is not so moist. The apparatus may readily be so designed and operated as to maintain within the drying rooms the exact temperatures necessary.

The large volumes of air thus supplied are greedy absorbers of moisture, and there is a consequent decrease in the time required for the drying process as compared with that under direct steam heat and at best only a moderate circulation of air.

If the rapidly increasing introduction of this system of heating, ventilating and drying in other lines of manufacture is any criterion, the evidence clearly points to an early extending of its application in the various departments of the rubber-mill.

RUBBER FOR QUICK MENDING.

HOW many women know of the value of rubber tissue for mending? To a busy housewife, whose time seems more than full, it is invaluable, according to the Philadelphia *Times*. It is to be had at the rubber stores, and it is usually sold by the ounce. It is just what its name would indicate,—a very thin piece of transparent rubber. It is sold at fifteen cents an ounce, which means a piece, perhaps, six or eight inches wide, and twenty inches long. The tissue will not cover up holes—that is, not satisfactorily—but it will strengthen thin or weak places, mend tears or cuts; in fact, repair any goods which has not actually lost a piece of itself, and it is nice for hemming.

We will suppose there is a three-cornered tear in a garment. First cut away the frayed threads, draw the edges together either with invisible stitches on the wrong side or by holding it with the fingers. Place a piece of the tissue, the right size, over the tear, and a piece of cambric or any other fabric desired over that, and press with a warm iron—quite warm, but not hot. Press firmly, and then remove the iron, and the mending is done. There must always be a surface between the rubber and the iron, or the former will melt and stick to the iron.

For hemming, if the material is a goods which will not ravel, turn it up once, slip a strip of the tissue just under the edge and press. If the goods must be turned twice, baste the narrow turn with long stitches on what will be the inner side, then turn again, slip in the tissue as before and press it. This, of course, does not apply to wash goods, unless you wish to renew the patch. It is very useful in mending umbrellas, repairing sleeves which are almost worn through, in straightening broken places in made-over goods, and in applying patches to the seat of the small boy's pantaloons.

THE Glendale Elastic Fabric Co. (Easthampton, Mass.) at their annual meeting on June 19, elected the following directors: S. T. Seelye (president), J. W. Greene, Jr. (treasurer), John Mayher, E. T. Sawyer, and E. D. Candee.

THE RUBBER-GOODS TRADE IN THE WEST.

THE great rubber-goods jobbing firm of E. B. Preston & Co. (Chicago) have purchased the business house in St. Joseph, Mo., embracing the two large store-rooms, Nos. 111-113 South Third street, for the extension of the trade built up in that city by their agent, H. A. Walker. The business is to remain under charge of Mr. Walker. Under the new arrangement more space will be available in the store and a regular wholesale and jobbing trade will be done in rubber footwear and clothing. It is said that this will be the only wholesale exclusively rubber house on the Missouri river.

While visiting St. Joseph recently Mr. Preston said to a reporter for the *Herald*, of that city:

"I see a marked improvement everywhere, especially in the country tributary to your great wholesale city and others upon the Missouri river, and we can hope with feeling of promise that business will be quite active this fall. I have come to St. Joseph to enlarge my interests, and those of Mr. Walker's, for the purpose of meeting this fall's business systematically and in larger capacity than before. The outlook demands it and I am here to meet that demand.

"The past year's depression, and that which now exists, has had a wonderful effect upon the prudent business interests of the west. Prudent dealers have reduced their stock and only added to them anew as positive demand suggested. Old indebtedness has been reduced, thus establishing a better condition for credit than has been known for years. The western merchants are in excellent condition, and with the promise of good crops and close attention to business will pull into an active business season that will prove an agreeable disappointment to many."

The new house will employ a large force of traveling salesmen, large enough to thoroughly canvass the territory tributary to St. Joseph. They will handle Meyer, Candee, Jersey, and Amazon rubber footwear, and also a complete assortment of Golden Rule mackintoshes and rubber clothing.

THE NAVIGATION OF THE AMAZON.

THE directors of the Amazon Steam Navigation Co., Limited, have issued their report for the year 1893, showing that, despite certain losses, including fire on the steamer *Tabatinga* and the wreck of the steamer *Içá*, the net working result of the year's business shows an improvement upon the figures for the preceding year. The company were able to pay dividends during the year amounting to 7 per cent. The capital stock of the company is £625,000, of which the shares issued, up to our latest advices, amounted to £505,237 10*s*. The directors report their regret at being unable to announce the renewal of navigation contracts with the Brazilian government. The tender submitted by the company was accepted by the government in July of last year, but so far has been withheld from publication in the official journal. Meanwhile the various services have been continued under a provisional contract referred to in last year's report. Among the annoyances of the company during the past year are mentioned several labor strikes consequent upon the increased cost of the necessaries of life, arising from the great depression of exchange.

The company's fleet embraces twenty-four steamers and two tugs, not including the wrecked *Içá*. The condition of the company's finances is such that, at the annual meeting held on June 27, it was stated that they were able to contract for the new steamers which are so much needed, and also the building of a trapiche, at Manáos. THE INDIA RUBBER WORLD is indebted for a copy of the annual report to the secretary of the company, William Wethered, Esq., 34, Great St. Helens, E. C., London.

RETURN OF A RUBBER-MAN FROM EUROPE.

MR. R. A. LOEWENTHAL, of Loewenthal & Morganstern, who sailed for Europe on a health trip in April last, returned on June 23 very much improved. To an INDIA RUBBER WORLD representative who called at the new offices of the firm, in the National Shoe and Leather Exchange Bank building, No. 271 Broadway, New York, Mr. Loewenthal said that during his sojourn in Europe he paid no attention whatever to the rubber business and visited none of the rubber-manufacturers in England and Germany, contrary to his usual course. His health required all his care, and he was most of the time in Carlsbad. There, however, Mr. Loewenthal met other American rubber-men, among them President Hicks and Secretary Warner of the Canfield Rubber Co. (Bridgeport, Conn.) and Mr. Moorhouse, the European agent of the Revere Rubber Co.

"It is remarkable to find," says Mr. Loewenthal, "what a great interest the Europeans take in American affairs, especially the tariff question. Everybody there is now talking about the McKinley bill (they call it Bill McKinley) and the new tariff. They are affected by our tariff situation, and watch it with concern and anxiety. There are whole sections of country in Germany and Austria almost depending on American markets for the disposal of their products, and they study our tariff legislation as carefully as we ourselves." The rubber trade, from all Mr. Loewenthal heard, is growing rapidly in Europe, notably in the electrical and bicycle industries.

RUBBER RECLAIMING CO. vs. LOEWENTHAL.

THE action brought against Mr. R. A. Loewenthal by the Rubber Reclaiming Co. to recover $75,000 damages, has just been discontinued without costs, on application of the plaintiff and with the consent of Mr. Loewenthal's counsel.

This action was originally brought in July, 1893, for damages for alleged breach of contract on the part of defendant and other charges. A motion for an injunction to restrain Mr. Loewenthal from buying, selling or dealing in rubber waste during the pendency of the suit, was argued before Justice Beach of the Supreme Court, in November last, by William H. Lee, one of plaintiff's attorneys, and Joseph H. Choate as counsel on behalf of the Rubber Reclaiming Co., and by William H. Blain, attorney on behalf of Mr. Loewenthal.

Judge Beach rendered his decision in February in favor of the defendant, denying the application for an injunction pendente lite, with costs, and intimating that there was grave doubts as to the right of the company to bring or maintain the action. The suit promised to be bitterly fought and the parties are to be congratulated on having reached so speedy a settlement of their difficulties.

A COMMITTEE of the United States Rubber Co. made a tour of inspection of the National India Rubber Co.'s plant on July 6, and, finding a large demand for the product of that mill, not only in shoes but in clothing, druggists' sundries, and mechanical goods, will recommend to the executive committee of the United States Rubber Co. some extensive improvements to the plant with a view of increased facilities to meet the requirements of the business.

RUBBER AND FIBER FOR ELECTRICAL USES.

THE opinions of those engaged in the electrical industries, in which both hard rubber and fiber are used for insulating and other purposes, are of special interest in connection with the discussion in the June number of THE INDIA RUBBER WORLD of the relative advantages and claims of hard rubber and the fiber substitutes for it. Several rubber-men expressed the opinion that the electrical people are experimenting with fiber, and that their practical conclusions will have great importance for the hard rubber trade in the future. The electrical industries are growing rapidly, and their consumption of hard rubber, large raw, promises to become much greater still.

Mr. H. M. Sage, the chief of the mechanical department of the Western Electric Co., was seen at the company's offices in New York. He said:

"It is difficult to give one's opinion on the matter offhand, but it may be said positively that, on the one hand, fiber has not displaced rubber in the electrical industries, and, on the other that fiber is not in danger of being superseded. In certain classes of electrical work fiber is now used where hard rubber was formerly used, the reason being the cheapness of the former. Fiber has no other advantage, at least in electrical work, over hard rubber than cheapness. The insulating properties of fiber are certainly inferior to those of rubber, and in any place where there is a liability of moisture rubber must be used. In dry places it has been found that fiber works well, and owing to the pressing need of cheapening goods, fiber is used to save expense. But on fine machines, instruments, and delicate work of all kinds hard rubber is used exclusively, because fiber does not allow the same finish and polish as rubber. We, the Western Electric Company, do not make cheap goods to any great extent, and hence our use of fiber is more restricted than is the case with other electrical concerns. But it is a fact that a few years ago—1889 and 1890—we were using more fiber than now. We found that in our class of goods,—fine instruments and tools chiefly,—rubber is necessary. Not only is fiber liable to absorb moisture, but it warps under the influence of heat or dampness. It may be that other companies have also returned to rubber during the last four or five years in certain lines of work, and this may have given the ground to the impression that fiber has proved disappointing and is being superseded. But it is not so. In cheaper work it is used very largely and will hold its own, but it was a mistake to try to use it on fine work. It is not disputed that rubber is the best insulator and that it looks much better than fiber. But fiber being so much cheaper, it is natural that manufacturers should use it wherever it is possible to do so without danger."

TRADE PUBLICATIONS.

ONE of the most original catalogues that it has ever been our good fortune to see is a tire catalogue that came to us from Ohio. On the cover is shown a howling swell, sitting upon an electric bicycle which he guides with one hand, the other hand being in his pocket. His cigar and single eye-glass in place, he is riding at ease and yet at full speed. Beneath is the legend, "Made in the United States." Within the typical Fourth of July orator with open mouth and hands extended delivers himself of a short oration which is used as a preface. On the next page over the title, "Made in France," is a French artist painting while on his wheel, the wheel itself running swiftly along over a row of wine-bottles, the corks of which are flying in all directions. "Made in Germany" represents the typical German with a keg of beer and a half-dozen "steins" on his wheel, a long pipe in his mouth and, for pneumatic tires, two strings of frankfurters. Above his head, looking like a halo, is a pretzel. "Made in Great Britain" pictures the lion with his crown rakishly placed over one ear riding a wheel swiftly down hill, while the unicorn sits in the background breathless with amazement. "Made in the Sandwich Islands" shows a beautiful dusky beauty astride a wheel with a parrot on one handle-bar, the wheel having in tow a soap-box wagon in which sits her dignified offspring waving an American flag. "Made in Russia" presents an official coasting down hill and almost running over a dynamite bomb. He is however protected, for in front of him he has spread an umbrella. All the spectator sees, therefore, are the soles of his feet, the umbrella and his head appearing over the edge. In the background two bears of the genuine Russian type are looking at him with the greatest admiration. "Made in China" shows Whang Bang with a big laundry-basket on his back, from which is depended a cage with a couple of rats in it, making quick time for home. "Made in Egypt" is a truly artistic scene. An ancient Egyptian is mounted on a modern wheel and is riding past a wonderfully-sculptured tomb when he runs over a dog owned by what is evidently a fashionable beauty of the time. An Egyptian policeman, with Hibernian features is about to rush in and arrest him. "Made in Akron" represents Mr. John F. Palmer gayly poised on a flying wheel a "G. & J." tire in one hand and an "Akron" in the other. The cap of his skull is thrown back showing that in accordance with popular slang he has a wheel in his head. The reader must not think that all this booklet contains is sketches, for on every other page there are terse, witty, and at the same time practical, descriptions of the three tires made by the B. F. Goodrich Co., Akron, Ohio.

—A very attractive booklet with the romantic title "Buried Treasures" has come to us. On the cover is pictured the typical red-shirted fireman holding in his hands the forked stick of witch-hazel with which certain gifted ones are able to discover the location of buried treasure. It is the most natural thing in the world that, on seeing a cover that gives such promise of interest, one should at once turn to the inside. There, briefly, one gets a talk on buried treasure, on Captain Kidd, on the divining-rod, on buried treasure in the city of New York, and on the unburied treasure that the booklet undertakes to expound. This latter treasure was, for example, a section of Leatherite hose that for six months lay in a damp spot in the ground and on being dug up was found to be treasure indeed, and as neither moth nor rust had attacked it, it was as perfect as when put there. Turning the leaves further, one learns that there are the Dragon Leatherite, the Czar Leatherite, the Comet Leatherite, those names being the trade-marks of different styles of hose, upon which mildew can get no hold. Further on the book shows cuts and gives description of the patent smooth-bore carbonized rubber suction hose, general fire-department supplies, etc., etc. The typographical effect of the whole is excellent and the headings of each page are worthy of especial note as they are printed in color and consist of an explanatory sentence that is very *apropos* and oftentimes wittily so. The booklet is issued by the New York Belting and Packing Co., Limited, No. 15 Park row, New York.

—One of the most elaborate and elegant trade catalogues that we have yet seen is that of the Boston Rubber Co., calling attention to their department for the manufacture of mackintoshes. The cover is printed in blue and gold, and a fac-simile of their handsome trade-mark, the "Bell brand." After a brief, business-like preface, one turns to the description and an elegant lithograph of a gentleman's coat, and, turning further, to a lithograph of the "Lord Chumley," further still to the

Inverness, next to the "Chesterfield," then to the "Rialto" box coat, then the driving box coat, and, last of all, to the ulster. The illustrations in this catalogue are wonderfully well-conceived and beautifully accomplished. Typographically, the catalogue is a work of art. Aside from this the descriptions of the various garments are to be commended for the reason that they are terse, business-like, and such that any customer may know exactly what he is buying. It is well worth the while of any one at all interested in gentlemen's mackintoshes to send for one of these catalogues.

IT HAPPENED IN BOSTON.

SCENE—Office of sales-agent of Blank Rubber Co. Enter customer in towering rage.

CUSTOMER—Where is your assistant?

SALES AGENT—He is here. What do you want of him?

CUSTOMER—He wrote me an insulting letter. I am going to slap his—

SALES-AGENT—What, a big fellow like you hit a little fellow like him? Why not try me?

CUSTOMER—My quarrel is with him, and unless he apologizes I shall slap his face.

SALES-AGENT—If he apologizes I shall lick him, and if you hit him I shall lick you, so take your choice.

[*Customer departs.*]

SCENE II.

On the street. Assistant on his way to lunch. Wrathful customer in ambush. They meet.

CUSTOMER (*towering over his victim*)—I demand an apology.

ASSISTANT (*pluckily*)—I refuse, for I was right.

[Customer pauses, then slaps assistant's face, and starts on a dead run down the street. Assistant pursues. Great excitement. Some bet on the big man and some on the little one. Finally the latter gains, and, leaping on the customer's back, belabors him with his fist. Customer rolls in the gutter. He struggles to get rid of his load but ineffectually. Finally by-standers interfere and he is relieved. Without a word he seizes his hat, leaps upon a car, and, when a couple of blocks away, turns and shouts: "I said I would thrash you, you little ——"]

THE DIARY OF A FISHERMAN.

CAMP SUNSHINE, on the shores of Moosehead lake, Maine, and its half owner, Willis Darling, of the Boston Woven Hose and Rubber Co., are both very pleasantly known to the readers of THE INDIA RUBBER WORLD. It is Mr. Darling's custom each summer to steal away from belting, packing, and hose and go a-fishing. He is a most enthusiastic disciple of the immortal Izaac and his persistence in angling is well shown forth by the brief record that his diary furnishes, showing one week's angling.

May 19.—Arrived at camp; spent the day in getting settled; the rest of the party went out on the lake and fished.

May 20.—Roof of house looked as if it might leak; spent day in repairing it; the rest went fishing and had fair luck.

May 21.—Too rainy to fish; overhauled the lockers and made cushions for lounges in sitting-room.

May 22.—Boys insisted on my going out on lake with them, although I had planned to paint the house; good catch.

May 23.—Painted house.

May 24.—Built smoke-house.

May 25.—Planted flower seeds and set up flag-pole.

May 26.—Spent day in driving a well.

From the above record it will be seen that Mr. Darling is the good genius of the camp, the one who looks out that everything is comfortable and orderly. Some may claim that this is not fishing, yet of the eight worthy fishermen who formed the party this year he secured the "Laker's" pool, carrying it off by catching an 8½-pound trout.

MR. BANIGAN'S OPINION.

A YOUNG man once came to Joseph Banigan with a patent on a rubber boot and asked his opinion upon it.

"The boot has already been shown me by a friend, and I told him, after careful examination, that it was utterly worthless," said Mr. Banigan pleasantly. "Now, I wouldn't say that to *you*, for I appreciate your ingenuity, nor do I wish to hurt your feelings. I will therefore say simply that I do not care to take hold of it."

And the young man went out of that bland presence so dissatisfiedly satisfied that it took him a week to find out whether he was complimented or snubbed.

MR. BANIGAN AND THE CHEMICAL RUBBER CO.

THE election of Mr. Joseph Banigan, president of the United Rubber Co., of which the Wales-Goodyear Rubber Co. is a member, as a director of the Chemical Rubber Co., has given rise to considerable speculation in the rubber trade as to the probable effect of Mr. Banigan's connection with the Chemical Rubber Co. upon the acid-patent suit now pending between this concern and the Wales-Goodyear Company. It has even been suggested that a compromise in the suit would be arranged. Mr. N. Chapman Mitchell, of the Chemical Rubber Co., in reply to a question of an INDIA RUBBER WORLD representative, stated positively that no compromise or cessation of the suit was either contemplated or at all likely.

"The suit will go right on," said Mr. Mitchell. "Even if Mr. Banigan owned 99 per cent. of the shares of the Chemical Rubber Co. he could not stop the suit, and as to any amicable agreement to drop it, none exists. Had there been any question of the cessation of the suit, Mr. Banigan would not have been elected, as my own vote, as well as that of Governor Bourne, was required to elect Mr. Banigan. We voted for Mr. Banigan, because, so far as the suit is concerned, his election makes no change in the situation. The reason Mr. Banigan has been elected director is because he owns shares of the Chemical Rubber Co. which it was thought desirable to have represented in the board of directors. As to the rubber suit, we are waiting for the other side. Our testimony is practically in, nothing remaining to be done except to have a cross-examination of our witnesses. It is for the people interested on the other side to get ready now."

EELSKIN ARMOR FOR TIRES.—F. L. Cook and E. A. Belding, of Springfield, Mass., have formed a copartnership for the manufacture of an eelskin armor for pneumatic tires. The invention, of which Mr. Clark is the patentee, consists of an armor, made of eelskin, which goes between the outside and the inside diameter of the inner tube on a pneumatic tire, covering the tread and sides of the tube. The invention has been tested thoroughly, having been ridden over tacks and barbed wire, and has given perfect satisfaction. It is stated that the armor does not affect the resilience of the tire in the least, and a set only weighs about ten ounces.—*Bicycling World.*

MACHINE FOR TESTING RUBBER HOSE.

THE accompanying drawings show the method in use on the New York, Lake Erie, and Western railroad for testing the relative "chafing endurance" of the different kinds and makes of rubber hose. Mr. A. E. Mitchell, the superintendent of motive power of this road, is the inventor of the machine, and he and Mr. E. B. Sheffer, the purchasing agent, kindly consented to explain the method and its advantages to a representative of THE INDIA RUBBER WORLD.

"The machine we use," said Mr. Mitchell, "is a simple home-made machine. So far as we know, no other railroad uses it or knows anything about it. It is not patented, as we have devised it simply for our own practical purposes. The thing came into existence to meet a demand. We had this problem to solve: for years we have had difficulty with our hose, as it

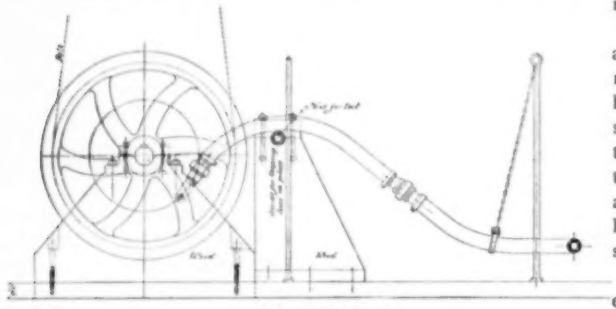


FIG. 1.—ELEVATION.

would wear out in a short time and be a source of expense and trouble. At first we attributed the rapid deterioration to the pressure of the air or steam, but close study and observation conclusively showed that the wearing out of the hose was the result of the chafing,—the friction and rubbing of the three kinds of hose against one another (on the train coaches three kinds of hose are used,—air-hose, steam-hose, and whistle hose). When we made that point sure, it at once occurred to us that a method might be devised whereby the chafing endurance of the different kinds of hose could be tested. Prior to the construc-

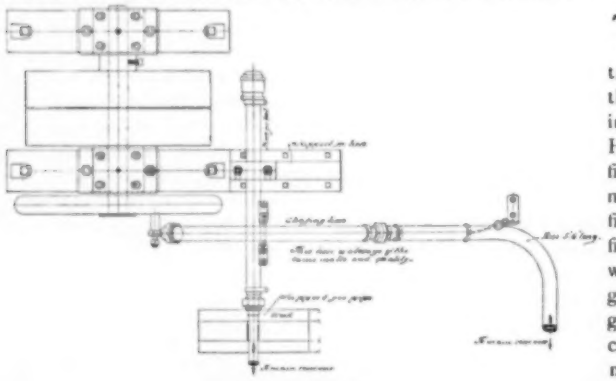


FIG. 2—SECTION.

tion of our machine, we would paint the hose bought of different manufacturers in different colors, and thus be able to tell always which make was superior and lasted longer. Now our machine renders this unnecessary. We can test the hose without actual use on the train, and know what to buy. Our test is perfectly satisfactory to us, and we are willing to abide by it. We have been obliged to reject the hose of many manufacturers that has failed to come up to the standard our method has evolved.

"To illustrate the success and method, an experience of ours may be cited. A salesman came to us and said that if we simply wished to have hose that would satisfy our test, he could readily supply us with it at even less cost than the usual rates. He gave us many different samples for testing, of various prices, without telling which were the more expensive kinds and which the less. We told him that we would determine their respective quality by submitting them to our test. And the result fully justified this prediction. The test brought out the differences in quality, and we graded them so that they corresponded exactly with the gradations of cost."

"The principle of the machine is simple. It causes one hose to travel rapidly across another, namely across the one to be tested, and the friction caused by the chafing hose in this way will wear a hole in the test hose. Now the hose that will stand this process the longest without yielding is naturally the best and most enduring.

"The machine works in this way: The hose to be tested is attached to the main reservoir, shown in the illustration by means of a pipe, the other end to be held in position by the hose-support bracket. Then the chafing hose, just above the support for pipe (which is always of the same make and quality, to eliminate any possible change of condition under which the test is made) is coupled to the crank-pin and to the main reservoir at the other end, to the right. Then air-pressure of 15 pounds is let into both hoses, and the machine is set in motion. The wheel shown makes sixty-five revolutions per minute."

The drawings show two views of the machine. No. 1 is the elevation and No. 2 a section or plan. In No. 1 the reader will observe the mode of operation very clearly by imagining the wheel in motion and the chafing hose traveling across the hose to be tested. Some hose will wear out in half an hour under this friction, and some will stand its ground a good deal longer, the best hose so far tested having lasted six hours. After this chafing test is completed the damaged portion of the hose is cut off, and the hose is submitted to a bursting test. The chafing test determines the quality of the duck.

THIS IS A TRUE FISH STORY.

THE manager of the Fairfield Rubber Co., Major W. W. Harral, is an enthusiastic yachtsman. During his vacation he spends most of his time on the water, and is more than likely to have several friends as guests. Quite recently he invited E. W. Harral, president of the company, and F. D. Hotchkiss, superintendent of the company, to join him in a fishing trip. Now Mr. Hotchkiss well knew that when the major was on his yacht he wanted only sailors and full-fledged fishermen with him, therefore, when his guest caught his first fish, the major was disgusted to have him demand a towel with which to wipe his fingers. He would, however, soon have forgotten this had not Mr. Hotchkiss, with all of the airs of a genuine dude, insisted on this sort of service every time he caught a fish, and as he happened to be very fortunate that day, not only were all of the clean towels used up in removing fish-scales and slime, but much of the other linen with which the yacht was supplied. The major kept his temper admirably, but it is rumored that he has employed one of the crew to file the barbs off all Mr. Hotchkiss's hooks, so that on the next fishing cruise the trouble will not be repeated.

IN referring to the removal to a new home of the Peerless Rubber Manufacturing Co. in last month's issue, No. 16 Murray street was erroneously given as their new place. The offices are at No. 15 Warren street.

TRADE AND PERSONAL NOTES.

THE Goodyear's India Rubber Glove Manufacturing Co. have recently removed their down-town New York store from No. 205 to No. 155 Broadway, the latter making a much handsomer and more convenient place of business. They carry in stock a full line of rubber goods, including rubber sporting outfits and coachmen's outfits. A unique feature of their window exhibit is a collection of the implements used by the native rubber-gatherers in Brazil. At every hour of the day people may be seen standing on the sidewalk and viewing the exhibit with a great deal of curiosity. The collection includes a bottle of the rubber sap as it appears immediately after gathering, an axe of the kind used by the natives in tapping the rubber trees, a number of small cups which are fastened to the trees to receive the sap, a gourd in which the sap is collected from the small cups, nuts used for creating smoke to coagulate the milk, and a paddle on which the sap is smoked. Those who have read the articles in THE INDIA RUBBER WORLD describing the processes of rubber gathering, smoking, etc., will get a more vivid idea of the subject if they inspect the tools which they have read so much about.

—Among new incorporations reported is that of the Chicago Rubber Bag and Metal Co., in Chicago, with $5000 capital, by George H. Dugrue, Joseph H. Dewyckoff, and George W. Crawford.

—At a meeting of the directors of the United States Rubber Co. held in New York on June 20, a semi-annual dividend of 4 per cent. was declared on the preferred stock of that corporation, payable July 14.

—Richard P. Towner, the well-known rubber salesman for Messrs. Towner & Co., of Memphis, Tenn., was one of the delegates from the Tennessee division to the National Convention of the Traveler's Protective Association, held at Milwaukee recently. Mr. Towner is a prominent member and director of the association at Memphis and takes great interest in the welfare of this active organization. Mr. Towner has recently booked orders from the fire-departments at Little Rock, Ark., Jackson and Yazoo City, Miss.

—Traveling men in the clothing line report the trade quiet. Among all the sections, the south perhaps is buying best, and from those looking after the jobbing trade there few complaints are heard. Almost all the big buyers in Baltimore, Richmond, Atlanta, Mobile, Memphis, and New Orleans having placed their first details. The same may be said of St. Louis, which has become one of the greatest distributing points for rubber clothing in the country.

—The late Newport (R. I.) Elastic Fabric Co., it is reported, is to be succeeded by a new concern, of which William J. Swinborne is the head. It is understood that Edward F. O'Brien, who was in charge of the mill for the Newport Elastic Fabric Co., will act as manager. It is also learned that the twelve looms which were not purchased by the E. Read Goodridge Co., at the recent assignee's sale, have been bought and that a portion of the belting and other appurtenances purchased by this company have also become the property of the gentleman who intends to start the mill.

—The Easthampton (Mass.) Rubber Thread Co., at their semi-annual meeting on June 19, reëlected the full list of officers and directors, and declared a dividend of 2 per cent.

—A writer for the *American Paper Trade* speaks thus kindly of Mr. Hudson Dickerman, the eastern agent of the Erie Rubber Co.: "While we were talking the office-door opened and a young man entered whose pleasant greeting and cordial manner would have won for him a welcome from even the most refigerative individual. He had tact and let himself into our chat in such an easy way that it seemed as if he had come straight from the metropolis for no other purpose than to give the information we sought,—but he did have other and more important business."

—Mr. Chester J. Pike, sales-agent of the Wales-Goodyear Rubber Co., will start soon for an outing at the Rangely lakes, Maine. His family, together with that of Mr. Harry Dutton, one of the merchant princes of Boston, will occupy one of the best-equipped camps in that paradise of anglers and hunters.

—The Hartford *Courant* gives the following news regarding the new rubber-factory in Middletown: "Mr. George B. Squires, superintendent of the Middlesex Rubber Works, has retired from his office. He was engaged as an expert by the company for ten years at a salary of $5000 a year and $5000 worth of the capital stock. The company allege that he did not turn out good goods and refused to pay him his salary. Mr. Squires at once left and has not since been at the factory. His statement of the trouble is that there was a preconcerted plan to get rid of him, and he has engaged Judge Elmer of Hartford as counsel. The difficulty will however probably be settled out of court. Mr. D. M. Baldwin succeeds Mr. Squires as superintendent."

—On July 6 and July 10, the final distribution of the assets of the F. J. Kaldenberg Co. took place, the receiver, Clarence Lexow, selling through M. F. Hatch, auctioneer and appraiser, the engines, boilers, shafting, belting, tools, and machinery used in the manufacturing of rubber goods, meerschaum pipes, buttons, etc., as well as goods and unfinished materials. At the time of going to press no complete official returns of the results of the sale had been returned to the attorney for the receiver, H. B. Kingham.

—Mr. C. Edward Murray, proprietor of the Crescent Insulated Wire Co., has been elected clerk of the city of Trenton, N. J.

—Mr. William Schrader, of Schrader & Ehlers, New York, agents of the Harburg Rubber Comb Co., has gone to Europe for his summer vacation.

—A prominent figure in the recent Masonic meetings in New York was Mr. Wheeler Cable, of the Cable Rubber Co. (Boston), as Sovereign Grand Commander for Scottish Rite Masonry for the United States and territories. He presided at the Sovereign Grand Consistory and Supreme Council held in New York.

—One of the most striking advertisements in the *Youth's Companion* recently, is that of C. J. Bailey exploiting his rubber bath-brush.

—Coupons due July 1, 1894, on the 6-per-cent. mortgage debenture bonds of the New York Belting and Packing Co., Limited, were paid upon presentation, on and after that date, at the office of the Knickerbocker Trust Co., No. 18 Wall street, New York. The same was true of coupons due July 1 on the first-mortgage gold bonds of the Mechanical Rubber Co.

—The Gleason and Bailey Manufacturing Co. (Seneca Falls, N. Y.) have sold a modern steel-frame city truck to the town of Gardiner, Me., and two handsome four-wheel horse hose-carriages to Key West, Fla. They have received orders for an improved hose-wagon for Braintree, Mass.; another steel truck for Cleveland, Ohio; a steel-frame truck for Portchester, N. Y.; a steel-frame hose-carriage for Bristol, R. I.; and a horse jumper for Troy, N. Y.

RUBBER TIRES FOR CARRIAGES.

IT is reported in the trade that three important carriage-manufacturing concerns, in different parts of the country, have begun regularly to equip carriages with the pneumatic tire. Heretofore carriage-manufacturers have only made occasional experiments in the direction of pneumatic tires. They would fit up an old carriage with tires or wait for a special order. What the new step means to the rubber trade hardly needs to be pointed out. The example of these important firms will be followed by others, and a new demand for crude rubber will thus spring up. Of course vastly more rubber will be needed for the carriage-wheel tires than for the bicycle-wheel tires, yet even the latter has played a very important part in the crude-rubber industry. In response to letters of inquiry two of the firms referred to have written as follows:

TO THE EDITOR OF THE INDIA RUBBER WORLD: It is our intention to engage extensively in the manufacture of pneumatic-tired carriages, providing the vehicle (Royal Queen's phaeton) we have built with these tires will stand the severe usage in this section, which we think it no doubt will. Even if new tires will be demanded at the end of one year, the highly-beneficial results and the general saving of other repairs, the cost of the pneumatic tire is but a very small item, compared with the hard, noisy riding qualities of the steel tire. We are firm advocates of the pneumatic tire and when the weak points of these tires are thoroughly overcome, think the general riding public who use fine vehicles will demand these valuable improvements. We will do our very best to bring these tires before the public, and are confident of success in the matter.

CHARLES BEHLEN'S SONS.

Cincinnati, Ohio, June 28, 1894.

TO THE EDITOR OF THE INDIA RUBBER WORLD: In reply to your letter I would say that I have "commenced to experiment" with the pneumatic-tired feature, as applied to carriages. I am just now, however, building my first carriage comprising this feature and cannot say at present, to what extent my business in the line may go. I cannot see why it should not be a grand success, and am in hopes that it will so prove, and that I shall be able to work up a considerable trade in that line.

A. FABER.

Rochester, N. Y., June 27, 1894.

The third firm referred to is that of Long & Silby, Albany, N. Y.

* * *

THE *Carriage Monthly* (Philadelphia) contains in the course of a month considerable matter of interest in relation to pneumatic sulky-wheels and pneumatic-tired wheels for carriages, which are advertised in its pages by several firms. The July *Monthly* mentions a new pneumatic sulky invented at Syracuse, N. Y. An item clipped from the same paper would indicate that in the tire industry, as in other departments of life, there is no new thing under the sun. It follows:

"At the Bath and West of England Agricultural Show, held at Guildford, a couple of carriage-wheels, fitted with pneumatic tires, were shown. These were made by May & Jacobs for the Duke of Northumberland forty-seven years ago, but they did not answer, the carriage proving very heavy for the horse, and so the wheels were disused. The tires were constructed on almost exactly the same principle as those in use on cycles to-day, an inner air-chamber, with a stronger outer cover. When punctured they were repaired by the same means as now adopted."

THE assignment is reported of A. J. Anderson, wholesale and retail dealer in electrical, sporting, and rubber goods, at Fort Worth, Texas, with liabilities over $50,000 and assets about $75,000. W. G. Newley is named as trustee.

REVIEW OF THE RUBBER MARKET.

"THE situation remains unchanged" is a formula which sums up the condition of things in the rubber trade at present and for the month past. Business has not improved, it is hardly necessary to say. Just as the manufacturers were beginning to congratulate themselves on the settlement of the tariff question, the great strikes and boycotts in the western states and territories were precipitated, with the result that all business is more uncertain and unsettled than ever. When goods cannot be shipped and transported, they are not bought, and manufactures come to a standstill. The railroad strikes involve ten states and territories, and its extension to other states, including the eastern, is feared. So absorbed are business men in the strike question that even the tariff, which for nine months or more has been the target for their comments, has been temporarily neglected.

Had it not been for the unexpected railroad troubles, it is believed that the passage of the tariff bill by the Senate early in the month, and the manifest disposition of the House to push the matter to a speedy determination, would have stimulated business to a marked extent and closed the dull period.

Apart from the influence of the general industrial condition on the rubber trade, factors peculiar to rubber have made the past month a quiet one. July is one of the dull months, and even in busy years it shows a falling off in arrivals and deliveries, while manufacturers in all lines, except the boot and shoe line, have less business than usual.

The receipts in Pará have been light. Only two steamers have arrived at this port since our last review with cargoes of Pará rubber. At present there is no steamer afloat having a rubber cargo. The deliveries have also been rather light, though the aggregate shows a more satisfactory figure than could have been expected. Manufacturers are naturally buying little and only when they absolutely must. Had prices shown any substantial decline, there would have been an inducement to buy and stock up for future use, but prices have remained very firm during the whole month, barring slight fluctuations due to special causes, such as the delay in the arrival of a certain cargo.

There are several reasons for the firmness of the market, the light receipts and deliveries have necessitated calls upon the stock of rubber in the hands of dealers and caused a considerable diminution of it. In England the deliveries have been steadily increasing, and, for the last month, are said to show a gain of over 22 per cent. on the deliveries of the corresponding month of 1893. Some very prominent rubber men believe that it is this growing English demand which has kept the American rubber market strong and prevented a serious fall in prices of coarse and fine Pará. On the European Continent, the consumption of crude rubber has also been steadily increasing. Finally, a strong reason for the firmness of the market is found in the hopeful feeling generally prevailing in the trade. No one is at all apprehensive of an indefinite continuance of the

business depression. Not only is the worst over, but the immediate outlook is believed to be decidedly encouraging. A good, brisk business is expected in the fall, and some rubber manufacturers are so sanguine now as to believe that their business at the end of the present year will show an advance over that of last year, in spite of the depression that has extended over two-thirds of the year. In another month, it is confidently said, the tariff will be a settled question, a memory. While the rubber clothing men are far from satisfied with the ad valorem duties, they are looking for an active trade as soon as a certain basis for operations is supplied. The great railroad strike will not last; failure or success, but a settlement of it is certain to take place within a short space of time. By September every obstacle to prosperity will have been removed, and capital and labor will be busy again.

With such a feeling in the trade, there is no wonder that prices refuse to yield. The outlook is indeed very promising. Stocks are exhausted, and the starting up of the wheels of industry has become a matter of necessity.

The arrivals next month are expected to be heavier than for the month past, four steamers having sailed for Pará in less than ten days.

Besides the Pará rubber brought direct from Pará, as given below in the list of imports, about 12,000 pounds of fine Pará were brought here from Liverpool on the *Umbria* early in July.

The latest quotations in the New York market are:

Pará, fine, new t a	65@67	Sierra Leone	20@38
Pará, fine, old	69@72	Benguela	43@44
Pará, coarse, new t a	44@50	Kongo Ball	37@38
Pará, coarse, old	48@53	Camaroon Ball	34@36
Caucho (Peruvian) strip	43@44	Flake, Ord. and Lump	24@25
Caucho (Peruvian) ball	47@48	Accra Flake	14@15
Mangabeira, sheet	35@37½	Liberian Flake	21
Esmeralda, sausage	46	Primest Pinky Madr	58@60
Guayaquil, strip	27@33	Madagascar, black	42
Nicaragua, scrap	43½	Borneo	26@40
Nicaragua, sheet	41½	Gutta-percha, fine grade	1.30
Thimbles	35@36	Gutta-percha, medium	1.00
Tongues	30@35	Gutta-percha, hard white	85

The statistical position of Pará rubber in New York and elsewhere is as follows:

	Fine and medium.	Coarse.	Total.
Stock, May 31, 1894	1167	81	1248
Arrivals, June	266	137	403
Aggregating	1433	218	1651
Deliveries, June	324	168	492
Stock, June	1109	50	1159
Stock in England, June 30			1435
Deliveries in England, June			490
Pará receipts, June			720
Stock in Pará, June			305
World's supply, June 30 [Excluding caucho.]			3250
Pará receipts, June-June [Crop year 1893-94.]			19,660

PRICES FOR JUNE.

	1894.		1893.		1892.	
	Fine.	Coarse.	Fine.	Coarse.	Fine.	Coarse.
First	65	43	74	48	68	46
Highest	66½	45	74	48	69	47
Lowest	65	42½	67	43	68	46
Last	66	44½	67	49	68	46

In regard to the financial situation Messrs. Simpson & Beers, brokers in crude India-rubber and commercial paper (New York), advise us:

"There is practically no change in the financial situation, as far as paper is concerned, since our last report. The ruling rates are 3½ @ 4 per cent. for prime bills receivable, and 4 @ 4½ per cent. for prime single-name notes, but there is very little rubber paper to be had."

AFRICAN RUBBER—LIVERPOOL.

TO THE EDITOR OF THE INDIA RUBBER WORLD: The market for medium descriptions of rubber has been very steady during the month of June. In most cases prices have been maintained, and for some descriptions, especially soft grades, an advance of ½*d* to 1*d* per pound has been paid. We have to record the following sales of importance: About 25 tons prime quality Accra biscuits, spot and for July-August delivery at 1/10¼@1/10½; about 35 tons Benguela Niggers at 1/8½@1/9; about 30 tons prime Pernambuco scrap at 1/3¼; about 30 tons Peruvian slab and strip at 1/8¼@1/8½.

The feature of the month is an advance of 1*d* per pound for soft Liberian, which is now held for 11½*d*. To-day's quotations are as follows:

Soft Liberian	11¼	@	11½*d*.
Soft Liberian (pasty)			6½*d*.
Hard Liberian			1/2
Accra, Cape Coast and Saltpond Biscuits of fair quality	1/9	@	1/10
Accra Biscuits, best quality	1/10½		
Addah Niggers	1/8½		
Prime selected Sierra Leone Niggers	1/5	@	1/6
Extra prime ditto	2/		
Grand Bassam and Assinee	1/3	@	1/3½
Prime Gambia Niggers	2/0½	@	2/1
Cameroon Clusters	1/5	@	1/7
Large Cameroon or Batanga Ball	1/4		
Best Kongo Ball	1/9	@	1/9½
Gaboon Ball or second Kongo Ball	1/5½	@	1/6
Thimbles	1/5	@	1/5½
Flake			11*d*.
Lump Flake			11½*d*.
Prime Black Manoh Twists	2/2		
Old Calabar	1/1½	@	1/2
Loanda Niggers	2/3½	@	2/4
Benguela Niggers c. i. f. New York	1/8	@	1/8¼

In the London market business has been restricted owing to the absence of good medium rubber. About 20 tons of Madagascar Niggers of fair quality have been sold at 1/1¼. Sellers are now asking 1/2½.

We append a statement of Liverpool rubber statistics for the month of June.

WM. SYMINGTON & CO.

Liverpool, June 30, 1894.

LIVERPOOL RUBBER STATISTICS.

	Pará grades.	Africans.
Stocks, May 31	3,404,800	1,341,760
Arrivals during June	900,480	645,120
	4,305,280	1,986,880
Stocks, June 30	3,203,200	1,299,200
Deliveries during June	1,102,280	687,680
As against deliveries during May	1,178,240	1,155,840

The stock of Pará rubber June 30 consists of:

	Fine.	Entre-fine.	Negroheads.	Total.
First hands	853	152	237	1,242 tons.
Second hands	154	18	16	188 "
Total	1,007	170	253	1,430 "

Stock of Ceará rubber on June 30, 154 bales; stock of Peruvian rubber, 32 tons.

GOULD COMMERCIAL CO.'S STATISTICS.

IMPORTS FOR JUNE (BY TONS).

GRADES.	New York.	Boston.	Total.
Parás	621	17	638
Centrals	121	..	121
Africans	214	29	243
East Indian	24	..	24
Totals	980	46	1,026

IMPORTS FROM PARA.

THE imports in detail of rubber direct from Pará at the port of New York, since our last report, have been as follows, all quantities being expressed in pounds:

June 27.—By the steamer *Clement*, from Pará and Manáos:

	Fine.	Medium.	Coarse.	Caucho.	Total.
New York Commercial Co.	108,400	10,000	47,000	1,000	166,500
C. Ahrenfeld & Sons	3,200	.....	1,400	142,800	147,400
Reimers & Meyer	43,800	6,700	43,900	30,500	124,900
Boston Rubber Shoe Co...	3,500	700	4,600	77,500	86,300
Lawrence Johnson & Co..	23,200	4,600	21,400	.....	49,200
Shipton Green.....	3,900	300	1,700	34,000	39,900
Joseph Banigan.....	3,200	300	4,600	1,700	9,800
Total	189,200	22,600	124,700	287,500	624,000

July 8.—By the steamer *Hilary*, from Pará:

New York Commercial Co.	16,100	600	20,200	101,400	138,300
Reimers & Meyer	33,900	4,600	46,700	16,000	101,200
Boston Rubber Shoe Co....	.....	.....	.....	4,500	4,500
Lawrence Johnson & Co...	22,100	1,400	14,900	.....	38,400
Shipton Green.....	12,100	800	4,200	.....	17,100
Total.....	84,200	7,400	86,000	121,900	299,500

June Imports from Pará.....	1,591,300
May Imports	926,300
April Imports.....	2,566,868
March Imports.....	2,177,400
February Imports	2,309,402

OTHER PARA ARRIVALS.

June 6.—By the steamer *Umbria*, from Liverpool:

Reimers & Meyer.....	11,194

June 14.—By the steamer *Majestic*, from Liverpool:

Reimers & Meyer.....	10,200

June 26.—By the steamer *Lucania*, from Liverpool:

George A. Alden & Co....	22,422
Reimers & Meyer.....	23,091

June 26.—By the steamer *Teutonic*, from Liverpool:

Reimers & Meyer.....	11,445

OTHER NEW YORK ARRIVALS.

BELOW will be found in detail the imports at New York, during June, 1894, of India-rubber from Mexico, Central America, and South America, other than Pará grades; also, arrivals at New York of African and East Indian sorts:

CENTRALS.

JUNE 2.—By the *Panama*=Colon and other ports:

	POUNDS.
Eggers & Heinlein..	400
G. Amsinck & Co ...	400
Total	800

JUNE 2.—By the *Delta*=Belize and other ports:

S. Samper & Co ...	9,500
To Order	1,500
Andreas & Co	2,000
A. P. Strout	5,200
O. G. Meyer & Co	2,000
Eggers & Heinlein	2,800
O. G. Meyer & Co	15,000
A. S. Lascelles & Co, ...	300
E. Zaraus & Co.....	150
R. Mandell.....	1,000
Total	39,450

JUNE 4.—By the *Seneca*=Tuxpan and other ports:

H. Marquardt & Co	150
H. A. Forrest & Co.....	300
Seeger & Guernsey.....	150
Total.....	600

JUNE 5.—By the *Sealey*=Bluefields:

W. H. Crossman & Brothers	9,000
Earle Brothers.	9,000
A. Steinhardt & Co	850
J. Worth	900
Total	20,350

JUNE 6.—By the *Centurion*=Vera Cruz:

Graham, Hinkley & Co	150
F. Frobst & Co....	200
H. Marquardt & Co.....	1,000
Total...	1,350

JUNE 8.—By the *Carib*=Truxillo and other ports:

Eggers & Heinlein	4,500
H. W. Peabody & Co.....	200
J. Agostini.....	500
Total....	5,200

JUNE 10.—By the *Andes*=Cartagena:

Schu'tz & Ruckgober.....	150
To Order.	800
W. R. Grace & Co	2,800
Total.	3,750

JUNE 11.—By the *Colombia*=Aspinwall and other ports:

G. Amsinck & Co.....	5,878
H. Feltman & Co...	2,200
J. Aparicio & Co.....	8,768
R. F. Cornwell	796
Louman & Kemp...	113
M. Espriella.....	3,851
M. C. Roldan & Van Sickel	2,984
A. Santos & Co...	3,152
Dumarest Bros	1,958
Flint & Co.....	5,600
J. M. Ceballos & Co.	2,500
Paraga Brothers.....	238
Jacob Baiz.....	58
W. R. Grace & Co	407
Piza, Nephews & Co.	4,800
Total.....	43,336

JUNE 11.—By the *Seguranca*=Tuxpan:

H Marquardt & Co	400

JUNE 12.—By the *Galileo*=Bahia:

Herbst Brothers....	8,000

JUNE 12.—By the *El Norte*=New Orleans:

W. R. Grace & Co	10,000
Earle Brothers	6,900
Total....	16,900

JUNE 18.—By the *Orizaba*=Frontera:

Theo. Hermann.....	1,000
J. Menend-z & Co..	400
Total	1,400

JUNE 21.—By the *City of Pard*=Aspinwall and other ports:

G. Amsinck.....	2,175
New York Commercial Co.....	5,700
Flint & Co.....	1,530
A. Santos & Co.....	2,283
J. Aparicio.....	3,579
J. Samper.....	1,047
R. F. Cornwell.....	1,184
H. Marquardt & Co....	350
Piza, Nephews & Co.....	822
H. Feltmann & Co...	1,000
W. R. Grace & Co	5,380
Dumarest Brothers.....	2,575
Munoz & Espriella...	2,250
J. M. Ceballos & Co.....	9,906
Hoadley & Co.....	990
G. Canton.....	142
A. N. Rotholz.....	115
D. A. de Lima.....	600
Lauman & Kemp	1,000
E. E. Britton.....	2,942
Total.	45,700

JUNE 25.—By the *Yumuri*=Tuxpan and other ports:

Thebaud Brothers.....	1,300
H. Marquardt & Co.....	150
L. Monjo, Jr.....	150
Total.....	1,600

JUNE 25.—By the *Athos*=Cartagena:

W. R. Grace & Co....	2,900
Flint & Co	400
Pim, Forwood & Co	5,600
Punderford & Co.	1,500
Total...	10,400

JUNE 28.—By the *Sealy*=Bluefields:

Andreas & Co.....	1,100
Earle Brothers.....	11,000
A. N. Rotholz & Co.....	900
Total.....	13,000
Total Centrals.....	212,186
Total Centrals for May..	174,906

AFRICANS.

	POUNDS.
JUNE 6.—By the *Paris*=England:	
George A. Alden & Co.....	2,392
JUNE 6.—By the *Rhaetia*=Hamburg:	
George A. Alden & Co.....	31,825
JUNE 6.—By the *England*=London:	
George Ropes	1,200
JUNE 14.—By the *Majestic*=Liverpool:	
Reimers & Meyer.....	27,688
JUNE 14.—By the *Olinda*= Lisbon:	
George A. Alden & Co.....	88,396
JUNE 26.—By the *Germanic*=Liverpool:	
W. A. Brown & Co.....	11,326
JUNE 26.—By the *Etruria*=Liverpool:	
George A. Alden & Co	15,963
JUNE 26.—By the *Rugia*=Hamburg:	
R. Soltau & Co.....	5,000
George A. Alden & Co	8,100
JUNE 26.—By the *Schiedam*=Rotterdam:	
Earle Brothers	3,000
JUNE 26.—By the *Tauric*=Liverpool:	
George A. Alden & Co.....	11,957
JUNE 26.—By the *Teutonic*=Liverpool:	
W. A. Brown & Co	7,061
JUNE 26.—By the *Paris*=England:	
W. A. Brown & Co	10,078
JUNE 26.—By the *Vega*=Lisbon:	
George A. Alden & Co.....	56,600
Reimers & Meyer.....	8,476
JUNE 28.—By the *Russia*=Hamburg:	
Reimers & Meyer	11,530
JUNE 28.—By the *Vega*=Lisbon:	
George A. Alden & Co.....	12,918
JUNE 28.—By the *Nomadic*=Liverpool:	
George A. Alden & Co	11,368
Total Africans...	324,908
Total Africans for May.....	363,037

EAST INDIAN.

	POUNDS.
JUNE 6.—By the *Rhaetia*=Hamburg:	
R. Soltau & Co.....	3,200
JUNE 6.—By the *England*=London:	
Ralli Brothers.....	7,632
JUNE 6.—By the *Runic*=Liverpool:	
George A. Alden & Co	4,930
JUNE 14.—By the *Armenia*=Calcutta:	
Ralli Brothers	12,147
JUNE 14.—By the *Campania*=Liverpool:	
George A. Alden & Co.....	10,825
JUNE 26.—By the *Paris*=England:	
Reimers & Meyer...	12,387
Total East Indian.....	51,121
Total East Indian for May.....	68,996

BOSTON ARRIVALS.

	POUNDS.
JUNE 3.—By the *Roman*=Liverpool:	
George A. Alden & Co., Africans	1,930
JUNE 12.—By the *Sagamore*=London:	
George A Alden & Co., Africans	2,150
JUNE 17.—By the *Hungaria*=Hamburg:	
George A. Alden & Co., Africans.....	5,260
JUNE 24.—By the *Michigan*=Liverpool:	
Geo ge A. Alden & o, Pará	11,160
Total Africans.	9,340
Total Pará...	11,160
Total for Boston.....	20,500
Total Boston for May.....	21,820
Total for April	136,100
Total for March.....	111,250
Total for February	154,140
Total for January....	58,600
Total for December.....	368,364
Total for November...	78,078

NEW ORLEANS.

JUNE.

	POUNDS.	VALUE.
From Nicaragua	29,547	$10,384